BLM LIBRARY
88013472

FINAL
ENVIRONMENTAL STATEMENT

THE PROPOSED RIO PUERCO LIVESTOCK GRAZING MANAGEMENT PROGRAM

Prepared by

DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

Bureau of Land Management
Library
Denver Service Center

88013472

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

SF
85.35
.N6
R56
1978

DEPARTMENT OF THE INTERIOR

FINAL
ENVIRONMENTAL STATEMENT
ON
GRAZING MANAGEMENT
IN THE
RIO PUERCO ES AREA

PREPARED BY

BUREAU OF LAND MANAGEMENT
DEPARTMENT OF THE INTERIOR

Frank Gregg
DIRECTOR, BUREAU OF LAND MANAGEMENT

Bureau of Land Management
Library
Denver Service Center

Summary

( ) Draft (X) Final Environmental Statement

1. Type of Action: Administrative (X) Legislative ( )

2. Brief Description of Action:

The Bureau of Land Management proposes to initiate an intensive livestock grazing management program through the implementation of Allotment Management Plans (AMPs) on 393,083 acres of public lands in the Rio Puerco Resource Area, Albuquerque District in Sandoval and McKinley Counties, New Mexico. The proposed action would include consolidation of 96 existing allotments into 61. Grazing systems which reserve sufficient forage for wildlife would be implemented and range improvements would include water developments, fences, cattleguards, stock trails, roads and vegetative manipulation. Along proposed pipelines, seventy-three water developments would be provided for exclusive wildlife use.

3. Summary of Environmental Impacts:

By the year 2000, the proposed action would approximately double forage production in the Rio Puerco ES Area. Soil losses would decrease by 180 to 540 tons per square mile per year depending on the soil associations involved; peak surface runoff would decrease by 25 percent. Improved vegatative conditions would provide winter habitat for an additional 595 deer and 50 elk. Also, yearlong habitat for an additional 143 antelope would be provided. Annual receipts from calf sales would increase approximately five times by the year 2000. In order to achieve these benefits, 68 ranches on 40 allotments would incur temporary reductions in licensed grazing use. Sixty-four ranches on 58 allotments would be combined with other allotments to form larger, more manageable units. Construction of range improvement projects would cause short-term disturbance of 1,069 acres of vegetation and soils. This disturbance would have minor adverse impacts on air and water quality. Construction would also increase adverse visual contrast and there would be small reductions in wildlife habitat. Cultural resources and paleontology sites could be disturbed by the construction projects; however, salvage would increase scientific data. Land alteration would adversely affect recreation in the short term; however, over the long term, the proposal would be beneficial to recreation.

4. Alternatives Considered:

   A. No Action
   B. No Grazing
   C. Short-Term Non-Use
   D. Forage Maximization
   E. Pasture Level Stocking

5. Comments have been requested from: See Attachment.

6. Date Statement made available to C.E.Q. and the public:

   Draft Statement: July 28, 1977
   Final Statement:

Attachment

Comments on the draft environmental statement were requested from the following agencies and interest groups. Those marked with an asterisk (*) submitted written responses.

FEDERAL AGENCIES

Department of Agriculture
    Forest Service*
    Soil Conservation Service
    Agricultural Stabilization and Conservation Service
Environmental Protection Agency*
Department of the Interior
    U. S. Fish and Wildlife Service*
    Bureau of Reclamation*
    Bureau of Outdoor Recreation*
    U. S. Geological Survey
    Bureau of Mines
    National Park Service
    Bureau of Indian Affairs*
Department of the Army
    Army Corps of Engineers
Advisory Council on Historic Preservation*

STATE AGENCIES

New Mexico State Clearinghouse
Office of the Governor
Game and Fish Department*
State Engineer
State Historic Preservation Officer*
State Land Office
State Planning Office*
Environmental Improvement Agency
New Mexico State University*
Eastern New Mexico University
University of New Mexico
State Highway Department
Middle Rio Grande Council of Governments

LOCAL GOVERNMENT

Sandoval County Commissioners
McKinley County Commissioners
Mayor, City of Bernalillo
Mayor, Village of Cuba
Mayor, Village of San Ysidro
Mayor, Village of La Jara

CONSERVATION ORGANIZATIONS

New Mexico Conservation Coordination Council
Sierra Club
New Mexico Wildlife Federation

National Wildlife Federation
Natural Resources Defense Council
National Council of Public Land Users
Wildlife Management Institute*
Central New Mexico Audubon Society*
Wilderness Society*
Ada County Fish and Game League
Friends of the Earth
Oregon Environmental Council
Nevada Outdoor Recreation Association

LIVESTOCK ORGANIZATIONS

Cuba Livestock Grazing Association
New Mexico Cattle Growers' Association*
Rio Puerco Grazing Association

PROFESSIONAL SOCIETIES

Society for Range Management*
Soil Conservation Society of America
Wildlife Society
Ecological Society

OTHER AGENCIES

Texas Tech University
Southwest Research and Development Company*

INDIVIDUALS

James Morgan

A public hearing was held in Albuquerque, New Mexico on August 30, 1977.

TABLE OF CONTENTS

FINAL

Rio Puerco Grazing Environmental Statement

PAGE

Chapter I - Description of the Proposed Action

Description of the Proposed Action I-1

Proposed Allotments I-1

Grazing Systems I-9

Development of Range Improvements I-21

Vegetative Manipulation I-34

Interrelationships With Other State and Federal Programs I-34

Manpower Required I-40

Chapter II - Description of the Environment

Description of the Existing Environment II-1

- Climate II-1
- Air Quality II-1
- Geologic Setting II-1
- Topography II-4
- Soils II-5
- Water Resources II-9
- Vegetation II-15
- Wildlife II-24
- Cultural Resources II-46
- Paleontology II-55
- Visual Resources II-61
- Recreation Resources II-63

TABLE OF CONTENTS (Continued)

PAGE

Livestock Grazing II-71

Mineral Resources II-82

Forestry II-84

Transportation Networks II-86

Socio-Economics II-86

Description of the Future Environment Without the Proposed Action II-96

Air Quality II-96

Topography II-96

Soils II-96

Water Resources II-96

Vegetation II-96

Wildlife II-103

Cultural Resources II-104

Paleontology II-105

Visual Resources II-105

Recreation II-106

Livestock II-106

Mineral Resources II-106

Forestry II-106

Transportation Networks II-110

Socio-Economics II-110

Chapter III - The Environmental Impacts of the Proposed Action

Air Quality III-1

Soils III-15

Water Resources III-20

TABLE OF CONTENTS (Continued)

	PAGE
Vegetation	III-22
Wildlife	III-39
Cultural Resources	III-48
Paleontology	III-51
Visual Resources	III-51
Recreation	III-53
Livestock Grazing	III-56
Forestry	III-60
Transportation Networks	III-60
Socio-Economics	III-61
Chapter IV - Mitigating Measures	
Mitigating Measures	IV-1
Chapter V - Adverse Impacts Which Cannot Be Avoided	V-1
Chapter VI - Short-Term Use and Long-Term Productivity	VI-1
Chapter VII - Irreversible and Irretrievable Commitment of Resources	VII-1
Chapter VIII - Alternatives to the Proposed Action	
Introduction	VIII-1
No Action	VIII-1
No Grazing	VIII-20
Short-Term Non-Use	VIII-32
Forage Maximization	VIII-40
Pasture Level Stocking	VIII-52
Chapter IX - Consultation and Coordination	IX-1
Appendices	A-1
Glossary	G-1
References	R-1

TABLES

TABLE	TITLE	PAGE
	Proposed Action	
I-1	Land Status for Acreage Included in Proposed Allotments	I-4
I-2	Summary Information on Forage Allocations and Grazing Systems on Public Lands by Allotment	I-5
I-3	Schedule for Implementing Proposed Allotment Management Plans	I-8
I-4	Specific Objectives of the Proposed Action	I-10
I-5	Acres Rested or Grazed Each Year With Intensive Grazing Management	I-17
I-6	Summation of Data for Range Improvement Construction	I-22
I-7	Proposed Range Improvement by AMP	I-23
I-8	Cost Data by Year and Type Range Improvement - Based on 1976 Cost Data	I-36
	Existing Environment	
II-1	Average Precipitation Per Month in Inches	II-2
II-2	Estimated Weighted Average Sediment Yield by Soil Associations	II-6
II-3	Average Sediment Yield from Different Soil Associations and Vegetative Sub-Types	II-7
II-4	Estimated Physical and Chemical Properties of Soil Associations	II-8
II-5	Estimates of Peak Runoff from Watersheds One Square Mile in Size	II-13
II-6	Average Percent of Composition for Vegetative Sub-Types	II-16
II-7	Average Percent Ground Cover by Vegetative Sub-Type	II-17
II-8	Estimated Present Forage Production by Vegetative Sub-Type	II-23
II-9	Poisonous Plants	II-25

TABLES

TABLE	TITLE	PAGE
II-10	Seven Threatened and Endangered Vegetative Species Selected as Possibly Occurring in the Rio Puerco ES Area	II-26
II-11	Expanded List of Threatened and Endangered Plant Species Which May Occur in the Rio Puerco ES Area	II-27
II-12	Endangered/Threatened Plants Collected	II-29
II-13	Mule Deer Habitat and Distribution	II-34
II-14	Birds	II-40
II-15	Small Mammals	II-41
II-16	Rodent Trapping Success and Vegetative Manipulation on Big Sagebrush-Shortgrass Site	II-43
II-17	Furbearing Mammals	II-44
II-18	Common Reptiles and Amphibians	II-45
II-19	Common Arthropods	II-47
II-20	Distribution of Cultural Resources by Cultural Affiliation and Environmental Zones	II-49
II-21	Distribution of Cultural Resources by Site Types and Environmental Zones	II-51
II-22	Distribution of Cultural Resources - Site Type and Culture Types by Environmental Zones	II-52
II-23	Number of Acres of Land Form Classes Sampled by Zone	II-56
II-24	Density of Cultural Sites Per Square Mile by Land Form Class and by Environmental Zones	II-56
II-25	Number of Cultural Resources Correlated with Vegetative Communities by Environmental Zones	II-57
II-26	Condition of Cultural Resources by Zone	II-57
II-27	Number of Deteriorated Cultural Resource Sites and Source of the Deterioration	II-58

TABLES

TABLE	TITLE	PAGE
II-28	Current Preservation Requirements to Stabilize the Condition of Cultural Resources	II-58
II-29	Percentage of Site Evaluations by Zone	II-59
II-30	Number of Known Sites by Culture Period by Environmental Zone	II-60
II-31	Visual Resource Management Classes	II-64
II-32	Estimated Recreation Use Levels (Visitor Days) by Recreation Activity	II-68
II-33	Off Road Vehicle Registration	II-70
II-34	Summary of Livestock Management Practices	II-74
II-35	Existing Use on Allotments With AMPs	II-75
II-36	Existing Use on Allotments Without AMPs	II-77
II-37	1976 Woodland Products Demand	II-87
II-38	Economic Summary of Receipts, Costs and Returns Per Ranch	II-91
II-39	Employment by Major Classification	II-91
II-40	Estimated Economic Activity	II-92
II-41	Estimated Population by Age and Sex	II-93
	Future Environment Without the Proposed Action (Year 2000)	
II-42	Estimated Weighted Average Sediment Yield - Soil Associations	II-97
II-43	Predicted Forage Production by Vegetative Sub-Types on Total ES Area Acreage	II-100
II-44	Predicted Average Percent Vegetative Ground Cover Changes on AMP and Non-AMP Areas by Major Vegetative Sub-Types	II-101

TABLES

TABLE	TITLE	PAGE
II-45	Anticipated Grazing Use - Current, Available, and Projected on Public Lands	II-108
II-46	Changes in Number of Ranches by Size for Ranches With and Without AMPs	II-111
II-47	Estimated Economic Activity	II-112
	Impacts of the Proposed Action	
III-1	Summary of Anticipated Impacts by Resource	III-2
III-2	Summary of Anticipated Impacts by Allotment	III-7
III-3	Acreage Data for Sources of Anticipated Impacts	III-14
III-4	Estimated Weighted Average Sediment Yield by Soil Association	III-16
III-5	Estimated Erosion Condition Classes	III-18
III-6	Estimates of Peak Runoff from the Ten Year Storm	III-21
III-7	Phenological Development Stages for Key Forage Plants	III-23
III-8	Present and Potential Forage Production for AMP and Non-AMP Areas, by Allotment, Soil Association and Vegetative Sub-Types	III-25
III-9	Predicted Forage Production by Vegetative Sub-Types on Total ES Area Acreage	III-29
III-10	Range Condition Classes by Allotment and by Total Vegetative Sub-Type Acres	III-31
III-11	Summary of Range Condition Classes by Vegetative Sub-Type	III-38
III-12	Potential Impacts of Range Improvements on Cultural Resources	III-49
III-13	Contrast Ratings for Action Which Would Not Meet VRM Class Objectives	III-52
III-14	Anticipated Recreation Demand: Year 2000	III-55

TABLES

TABLE TITLE PAGE

III-15 Projected AUMs on Public Lands III-57

III-16 Initial Adjustments in Livestock AUMs - Increases and Reductions III-58

Mitigating Measures of the Proposed Action

IV-1 Mitigating Measures IV-2

Short-Term Use Versus Long-Term Productivity

VI-1 Summary of Trade-Offs VI-2

Alternatives to the Proposed Action

VIII-1 Comparison of Impacts for Major Resource Components: Proposed Action and Alternatives VIII-2

No Action Alternative

VIII-2 Summary of Anticipated Impacts by Resource VIII-4

VIII-3 Summary of Impacts by Allotment VIII-5

VIII-4 Estimated Weighted Average Sediment Yield for Associations VIII-9

VIII-5 Estimated Peak Runoff from the Ten Year Storm VIII-10

VIII-6 Anticipated Recreation Use Levels VIII-14

VIII-7 Livestock AUMs Available on Public Lands for Allotments With and Without AMPs VIII-15

VIII-8 Summary of Receipts, Costs, Returns per Ranch (Year 2000) VIII-17

VIII-9 Mitigating Measures VIII-18

No Grazing Alternative

VIII-10 Summary of Anticipated Impacts by Resource VIII-22

VIII-11 Summary of Impacts by Allotment VIII-23

VIII-12 Anticipated Recreation Use Levels VIII-27

VIII-13 Summary Receipts, Costs and Returns Per Ranch VIII-29

TABLES

TABLE	TITLE	PAGE
VIII-14	Mitigating Measures	VIII-31

Short-Term Non-Use Alternative

VIII-15	Estimated Acres - Rested or Grazed	VIII-33
VIII-16	Typical Short-Term Non-Use Grazing Schedule	VIII-34
VIII-17	Summary of Anticipated Impacts by Resource	VIII-35
VIII-18	Summary of Impacts by Allotment	VIII-36
VIII-19	Anticipated Recreation Use Levels	VIII-39
VIII-20	Mitigating Measures	VIII-41

Forage Maximization Alternative

VIII-21	Summary of Proposed Vegetative Manipulation	VIII-43
VIII-22	Summary of Anticipated Impacts by Resource	VIII-44
VIII-23	Summary of Impacts by Allotment	VIII-45
VIII-24	Anticipated Recreation Use Levels	VIII-47
VIII-25	Summary of Receipts, Costs, and Returns Per Ranch (Year 2000)	VIII-49
VIII-26	Mitigating Measures	VIII-51

Pasture Level Stocking Alternative

VIII-27	Proposed Stocking	VIII-53
VIII-28	Summary of Anticipated Impacts by Resource	VIII-56
VIII-29	Summary of Impacts by Allotment	VIII-57

MAPS

MAP	TITLE	PAGE
I-1	Rio Puerco ES Area	I-3
I-2	Habitat Management Plans	I-38
II-1	Geologic Setting	II-3
II-2	Present Erosion Conditions	II-10
II-3	Primary Elk Distribution	II-32
II-4	Primary Deer Distribution	II-33
II-5	Primary Antelope Distribution	II-36
II-6	Primary Turkey Distribution	II-38
II-7	Cultural Resource Environmental Zones	II-50
II-8	Visual Resource Management Classes	II-65
II-9	Recreation Rating Areas	II-66
II-10	Recreation Map - Region of Comparison	II-67
II-11	Existing Allotments	II-73
II-12	Mineral Resources	II-83
II-13	Transportation	II-88
II-14	Rio Puerco Socio-Economic Study Area	II-89
II-15	Estimated Future Erosion Conditions	II-98
II-16	Visual Resource Management Classes	II-107
III-1	Estimated Erosion Conditions for Proposed Action	III-17
VIII-1	Fences Needed to Prevent Trespass: No Grazing Alternative	VIII-21

FIGURES

FIGURE	TITLE	PAGE
I-1	Rest Rotation Grazing System	I-18
I-2	Deferred Rotation Grazing System	I-20
I-3	Wells	I-27
I-4	Springs	I-28
I-5	Catchment	I-29
I-6	Pit Tanks, Stock Trail	I-32
I-7	Pipeline Arroyo Crossing; Drinking Troughs, Flout Chambers, Wildlife, Watering Devices, Storage Tank	I-33
I-8	Fences	I-35
I-9	Manpower	I-41
II-1	Distribution of Annual Streamflow	II-12
II-2	Ponderosa Pine	II-18
II-3	Big Sagebrush	II-18
II-4	Four-Wing Saltbush	II-19
II-5	Greasewood	II-20
II-6	Shortgrass	II-20
II-7	Broom Snakeweed	II-21
II-8	Pinyon-Juniper	II-21
II-9	Steep and Rocky	II-22
II-10	Barren Areas	II-22
II-11	Estimated Percentage Diet Overlap for Deer, Elk, Antelope and Cattle	II-31
II-12	Remote Natural Quality	II-61
II-13	Topography	II-61
II-14	Woodlands	II-61
II-15	Line	II-62
II-16	Texture	II-62

Chapter I

Description of Proposed Action

CHAPTER I

DESCRIPTION OF PROPOSED ACTION

The Bureau of Land Management proposes to initiate an intensive livestock grazing management program through the implementation of Allotment Management Plans including development of necessary range improvements. This proposal involves 61 allotments on approximately 600 square miles of public lands in North-central New Mexico. This area is administered by the Bureau's Albuquerque District Office. The Rio Puerco Grazing Environmental Statement (ES) aggregates the 61 allotments for the purpose of analyzing the anticipated environmental impacts of intensive livestock grazing management on public lands.

Objectives

The objectives of the Bureau of Land Management (BLM) are to improve range conditions to an acceptable level, reduce erosion, improve water quality and enhance other environmental values. To achieve these objectives it is proposed to:

1. Combine some existing allotments into new allotments in the interest of management, economics and environmental considerations.
2. Adjust grazing use to correspond with existing forage production.
3. Initiate Allotment Management Plans (AMPs) with grazing management systems designed to permit individual plants to fulfill their biological needs.
4. Construct supportive measures (range improvements necessary to implement the proposed action) such as fences, water facilities, trails, and vegetative manipulation.

(See glossary for definitions of technical terms used in this ES.)

Setting

The Rio Puerco ES Area is an irregularly shaped tract of semi-arid land located 40 miles northwest of Albuquerque. (See Map I-1). The area extends about 40 miles from north to south and just less than that from east to west at the widest point. Located at the southeastern edge of the San Juan Basin, it varies from 5,450 feet to almost 9,000 feet in altitude, has little if any dependable surface water, and is largely grassland. It has fewer than 400 inhabitants.

The area is bordered on the north by the Jicarilla Apache Indian Reservation, on the east by the Santa Fe National Forest and Jemez Indian Reservation, on the south by the Cibola National Forest and private land, and on the west by public lands, state, Navajo Indian and private lands. The area covers approximately ten percent of the watershed of the Rio Puerco, largest stream in the vicinity and an intermittently flowing tributary of the Rio Grande. Detailed visuals relating to the proposed action are included in the back pocket as follows: Visual A, Proposed Allotments and Land Status; Visual B, Soil Associations and Vegetative Sub-types; Visual C, Existing and Proposed Improvements.

Proposed Allotments

Of the 511,916 acres (800 square miles) within the Rio Puerco ES Area boundaries, 393,083 acres (614 square miles) are public lands managed by BLM. The rest of the land is private or owned by the State of New Mexico. Allotment Management Plans (AMPs), would cover 492,063 acres (769 square miles), including 393,083 acres of public lands and 97,380 acres state and private land. The remaining 19,853 acres (31 square miles) consist of state and private lands located within the boundaries. These lands are omitted from the allotment program because they are not used in conjunction with public lands. (See Table I-1 for land status; also, Visual A in the back pocket.) At present the 134 livestock licensees graze in 96 allotments in the area. Each allotment is assigned grazing privileges measured in terms of animal unit months (AUMs) under BLM regulations. An AUM is the forage needed to support one cow or horse or five sheep or goats for one month. In addition, an AUM is the forage needed to support one elk, five deer or five antelope for one month. Individual licensed use on public lands ranges from 12 to 3,236 AUMs. Under the proposal, the number of allotments would be reduced to 61 and livestock grazing would be permitted on 57 of these, covering all but 520 acres of the public lands. Three small allotments totaling 424 acres would be reserved for wildlife, and a fourth allotment involving 96 acres would remain unallotted. The 57 active livestock allotments would vary from 683 acres (65 AUMs) to 24,668 acres (3,232 AUMs) in size and would all be licensed for cattle. Sixteen (131,696 acres) would also be authorized to graze some horses. A single allotment, of 1,467 acres, would be permitted sheep and goats in addition to cattle and horses. (Figures are based on current usage.)

In 1975, BLM conducted an extensive resource inventory in the Rio Puerco ES area. The present grazing capacity was determined using this data (see Appendix I-1 for Methodology) and data from the San Luis Watershed Study, 1971 (see Appendix I-2 and Visual A in back pocket).

Table I-2 shows the grazing management program proposed for each allotment. See Appendix I-3 for comparison of existing and proposed allotment names and numbers. Allotments are shown according to proposed grazing systems (column 6), and other information includes season of use (column 7), grazing privileges (column 8), and the 1975 resource inventory findings on forage capacity (column 9).

In determining AUMs which would be available for livestock licensing under the proposal, AUMs which would be reserved to support wildlife needs as determined in each AMP (column 10) were subtracted from 1975 forage capacity AUMs. The remaining AUMs would be available for livestock licensing (column 11). Where available AUMs are less than existing privileges, the difference between grazing privileges and the AUMs available for livestock would become suspended non-use AUMs (column 12). That portion of the privileges placed in suspended non-use cannot be used by the licensee until the range has improved, and such use is authorized. Wildlife AUMs were reserved entirely from public lands. Regardless of whether wildlife AUMs are taken from public or other lands, net stocking rate for the entire allotment remains the same.

Allotment Management Plans

An AMP is essentially a livestock grazing plan covering a selected unit of range. It prescribes the grazing system to be used, along with range improvement projects necessary in the pursuit of overall range improvement.

The AMP specifies the number and kind of livestock to be grazed, seasons of use, and a schedule for grazing and resting pastures for each allotment. Unauthorized deviation from use as scheduled in the AMP would be subject to uniform and strictly enforced trespass actions. AMPs also outline range improvements to be implemented.

Steps followed in the preparation of proposed AMPs were:

(1) Obtaining guidance from Management Framework Plan (MFP) to determine suitability for grazing, allocations of AUMs, and areas of AMP development;
(2) collecting and analyzing resource data;
(3) establishing objectives;
(4) developing a grazing system which accomplishes the objectives;
(5) establishing location of range improvements required to implement the grazing system; and
(6) developing procedures to evaluate the effectiveness of each grazing system.

Of the 96 existing allotments 21 have AMPs implemented on 143,865 acres of public lands. Six others have not been implemented. Of the 21 active AMPs, 13 would continue basically unchanged under the proposal. Eight would be changed to compensate for poor vegetative response to date or because allotments were combined with others in the proposed shift to 61 allotments.

Implementation of AMPs

The proposed Allotment Management Plans would be put into operation over a four year period. Table I-3 shows the planned schedule of implementation by year and by allotment name, number, and acres and AUMs involved, on public lands. This schedule was developed in conjunction with range improvement construction. The 21 AMPs currently active would continue to operate, and the eventual revision or replacement of eight would be dependent on the scheduled construction of necessary range improvements.

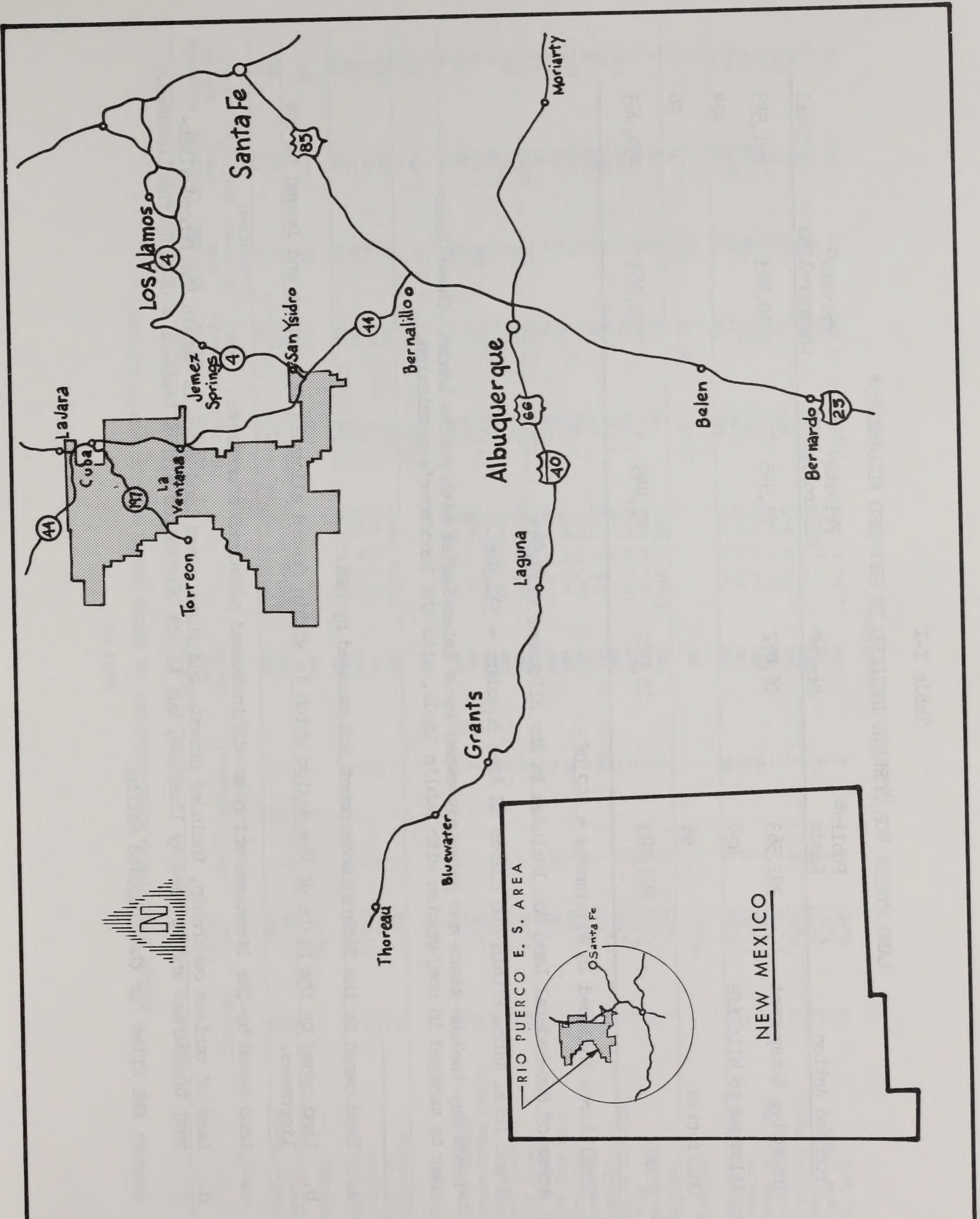
General Objectives

General objectives contained in the AMPs for all proposed allotments are as follows:

1. Minimize soil disturbance caused by livestock grazing.
2. Improve watershed condition.
3. Produce a more vigorous vegetative cover of usable forage.
4. Provide for a diversified complex of grasses, forbs and shrubs.
5. Provide a range in an improved condition that is capable of supplying forage for livestock and wildlife and other resource uses on a sustained yield basis.
6. Achieve better use of all range forage species by means of improved livestock distribution.
7. Minimize wildlife/livestock competition on desirable browse species during the critical period for wildlife (December to April).
8. Protect threatened and endangered plant and animal species where found.

Specific Objectives

In addition to the general objectives for all managed areas, the Allotment Management Plan for each allotment sets forth specific objectives which would be attained by the year 2000. For each allotment, specific targets have been established in terms of wildlife habitat, erosion, forage production for livestock, species and quantity of vegetation, and range condition.


Santa Fe
Moriarty
85
Los Alamos
4
San Ysidro
Jemez Springs
4
44
Bernalillo
La Jara
Cuba
197
La Ventana
44
Torreon
Albuquerque
66
40
Belen
Bernardo
25
Laguna
Grants
Bluewater
Thoreau
N
RIO PUERCO E. S. AREA
Santa Fe
NEW MEXICO

MAP I-1

Table I-1

LAND STATUS FOR ACREAGE INCLUDED IN PROPOSED ALLOTMENTS*

Proposed Action	Public[a] Lands	State[b]	Private[c] Controlled	Private[d] Uncontrolled	Total
Intensive Management	392,563	26,072	61,945	10,963	491,543
Allotted to Wildlife	424				424
Unallotted	96				96
TOTAL	393,083	26,072	61,945	10,963	492,063

Total Acres Included In Allotments = 492,063

Acres of Non-Federal Land Not Included In Any Allotment = 19,853

Grand Total Acres Within Rio Puerco ES Area Boundary = 511,916

*Lands may include state and privately owned lands intermingled with public lands. These lands may be managed in conjunction with public lands, with the landowner's permission.

---

[a] Land owned by the Federal Government and managed by BLM.

[b] Land owned by the State of New Mexico which is within fenced allotment boundaries and leased to the licensees.

[c] Land owned by the licensees which is within fenced allotment boundaries.

[d] Land of various ownership, includes private and state owned land which is within the fenced allotment boundaries and is used by licensee, but is not controlled with a lease or a deed by the licensee.

Source: AMP Files for the Proposed Action.

Table I-2

SUMMARY INFORMATION ON FORAGE ALLOCATIONS AND GRAZING SYSTEMS ON PUBLIC LANDS BY ALLOTMENT

1	2	3	4	5	6	7	8	9	10	11	12
Allotment^{a}	Allotment Number^{b}	Public Land Acres	AMP Status^{c}	Class of Livestock^{d}	# Pastures and Grazing System^{e}	Season of Use^{f}	Grazing Privilege AUMs^{g}	1975 Forage Capacity AUMs^{h}	Wildlife AUMs Reserved (Competitive)	Livestock AUMs Available	Suspended Non-Use AUMs^{i}
Corrales Tierra	55	784	P	C	1RR	7-15 to 2-28	120	74	6	68	52
Senorito	19	683	P	C	1RR	Varies Yearly	152	102	6	96	56
SUBTOTAL		1,467			1RR		272	176	12	164	108
Mesa Portales	17	1,996	P	C	2RR	10-16 to 6-15	376	350	20	330	46
Nacimiento	14	1,418	P	C	2RR	11-1 to 5-31	302	242	18	224	78
Ridge Top	24	1,150	P	CH	2RR	11-1 to 5-31	231	205	2	203	28
Salado-Tapia	51	3,183	P	C	2RR	Varies Yearly	480	290	12	278	202
SUBTOTAL		7,747			2RR		1,389	1,087	52	1,035	354
Arroyo Alamito	45	3,710	P	C	3RR	10-1 to 5-31	504	750	12	738	0
Arroyo Piedra Parada	54	3,631	P	C	3RR	3-1 to 2-28	518	462	24	438	80
Cachulie	39	10,136	P	C	3RR	11-1 to 4-15	1,512	1,743	150	1,593	0
Cebo Community	33	7,280	P	C	3RR	10-1 to 6-15	1,135	1,338	30	1,308	0
Coal Creek	29	5,268	P	C	3RR	3-1 to 2-28	1,010	668	27	641	369
El Banquito	49	14,725	P	C	3RR	3-1 to 2-28	1,836	1,674	111	1,563	273
Fork Rock Mesa	16	800	P	C	3RR	11-1 to 5-15	118	66	1	65	53
Forty-four	18	2,484	P	CH	3RR	3-1 to 2-28	438	499	10	489	0
Gypsum Hill	61	4,434	P	C	3RR	10-1 to 6-30	480	282	20	262	218
Lagunitas	12	1,467	P	CHS	3RR	3-1 to 2-28	144	171	12	159	0
Ojo de los Pinos	8	5,685	E	C	3RR	3-1 to 2-28	1,017	1,029	34	995	22
Pelon	3	8,197	E	C	3RR	10-1 to 6-31	1,197	804	11	793	404
San Pablo	20	2,753	P	C	3RR	3-1 to 2-28	431	460	60	400	31
Shroyer	2	4,573	E	C	3RR	10-15 to 5-31	743	755	12	743	0
SUBTOTAL		75,143			3RR		11,083	10,701	514	10,187	1,450
Arroyo Empedrado	36	3,507	P	CH	4RR	3-1 to 2-28	601	490	18	472	129
Azabache	42	17,298	P	CH	4RR	3-1 to 2-28	2,587	2,111	30	2,081	506
Banco de la Casa	52	4,857	P	CH	4RR	3-1 to 2-28	653	524	25	499	154
Cabezon Peak	44	11,139	P	C	4RR	3-1 to 2-28	2,005	1,557	34	1,523	482
Canon del Camino	53	4,943	P	C	4RR	3-1 to 2-28	904	497	37	460	444
Cerro Cuate	41	2,606	P	C	4RR	3-1 to 2-28	488	436	24	412	76
Cucho Arroyo	57	4,615	P	C	4RR	3-1 to 2-28	408	436	16	420	0
Dry Well	27	9,564	P	C	4RR	3-1 to 2-28	1,544	1,025	12	1,013	531

-continued-

Table I-2 (continued)

1 Allotment[a]	2 Allotment Number[b]	3 Public Land Acres	4 AMP Status[c]	5 Class of Livestock[d]	6 # Pastures and Grazing System[e]	7 Season of Use[f]	8 Grazing Privilege AUMs[g]	9 1975 Forage Capacity AUMs[h]	10 Wildlife AUMs Reserved (Competitive)	11 Livestock AUMs Available	12 Suspended Non-Use AUMs[i]
Horn Arroyo	9	4,757	E	CH	4RR	3-1 to 2-28	780	667	12	655	125
Lost Valley	40	11,377	P	C	4RR	3-1 to 2-28	1,853	2,508	150	2,358	0
Mesa Cortada	48	6,252	P	CH	4RR	3-1 to 2-28	576	628	23	605	0
North San Luis Mesa	37	4,187	P	C	4RR	3-1 to 2-28	688	556	34	522	166
Pipeline	56	10,860	P	CH	4RR	3-1 to 2-28	1,425	1,831	83	1,748	0
Rio Salado Community	59	9,063	P	C	4RR	3-1 to 2-28	745	802	30	772	0
Rock House	60	8,743	P	C	4RR	3-1 to 2-28	778	1,006	30	976	0
San Luis Community	38	5,039	E	CH	4RR	3-1 to 2-28	792	916	19	897	0
San Ysidro Pasture	46	5,490	P	C	4RR	3-1 to 2-28	876	756	12	744	132
Valle San Isidro	15	4,723	P	C	4RR	3-1 to 2-28	728	314	16	298	430
SUBTOTAL		129,020			4RR		18,431	17,060	605	16,455	3,175
Chico Crossing	43	13,063	P	C	5RR	3-1 to 2-28	2,131	1,740	185	1,555	576
Continental Divide	1	10,270	P	C	5RR	3-1 to 2-28	1,732	1,594	84	1,510	222
Dry Springs	5	6,056	E	C	5RR	3-1 to 2-28	850	837	17	820	30
Eagle Mesa	23	12,550	P	CH	5RR	3-1 to 2-28	1,634	1,664	36	1,628	6
Guadalupe Community	47	6,455	P	C	5RR	3-1 to 2-28	792	717	24	693	99
Penistaja	11	19,619	E	CH	5RR	3-1 to 2-28	3,677	3,191	47	3,144	533
Piedra Lumbre	28	4,140	E	CH	5RR	3-1 to 2-28	789	673	52	621	168
Torreon Wash	35	4,812	P	C	5RR	3-1 to 2-28	642	630	36	594	48
Twin Butte	34	10,628	P	C	5RR	3-1 to 2-28	1,660	961	40	921	739
SUBTOTAL		87,593			5RR		13,907	12,007	521	11,486	2,421
Brandy	10	22,368	P	CH	6RR	3-1 to 2-28	3,602	3,355	140	3,215	384
Starr	4	12,787	E	CH	6RR	3-1 to 2-28	1,788	1,534	20	1,514	274
SUBTOTAL		35,155			6RR		5,390	4,889	160	4,729	658
Ignacio Chavez Grant	50	24,668	P	C	7RR	3-1 to 2-28	2,621	3,928	1,084	2,844	0
SUBTOTAL		24,668			7RR		2,621	3,928	1,084	2,844	0
Chiuilla Community	7	9,389	E	C	8RR	3-1 to 2-28	1,828	1,924	96	1,828	0
SUBTOTAL		9,389			8RR		1,828	1,924	96	1,828	0
TOTAL REST ROTATION		370,182			Rest Rotation		54,921	51,772	3,044	48,728	8,166

Table I-2 (continued)

Page 3 of 3 Pages

1	2	3	4	5	6	7	8	9	10	11	12
Allotment[a]	Allotment Number[b]	Public Land Acres	AMP Status[c]	Class of Livestock[d]	# Pastures and Grazing System[e]	Season of Use[f]	Grazing Privilege AUMs[g]	1975 Forage Capacity AUMs[h]	Wildlife AUMs Reserved (Competitive)	Livestock AUMs Available	Suspended Non-Use AUMs[i]
Elk Springs	30	2,561	E	CH	2DR	4-1 to 10-15	242	267	99	168	74
Mighty Mite	58	1,111	E	C	2DR	10-1 to 3-31	120	130	5	125	0
SUBTOTAL		3,672			2DR		362	397	104	293	74
Tres Hermanos	6	3,416	E	C	3DR	11-1 to 6-15	543	687	30	657	0
SUBTOTAL		3,416			3DR		543	687	30	657	0
Canada Candelaria	31	5,219	P	C	4DR	3-1 to 2-28	920	663	27	636	284
Los Pinos Arroyo	26	2,024	P	C	4DR	3-1 to 2-28	195	176	75	101	94
SUBTOTAL		7,243			4DR		1,115	839	102	737	378
Cerro Colorados	32	8,050	P	C	5DR	3-1 to 2-28	1,284	573	33	540	744
SUBTOTAL		8,050			5DR		1,284	573	33	540	744
TOTAL DEFERRED ROTATION		22,381			Deferred Rotation		3,304	2,496	269	2,227	1,196
Bama	21	96	P	-	Unallotted	No Use	0	7	7	0	0
Molino	13	80	P	-	None	N/A	0	5	5	0	0
Rock Ridge	25	264	P	-	None	N/A	0	17	17	0	0
San Miguel	22	80	P	-	None	N/A	0	6	6	0	0
SUBTOTAL		424			None		0	28	28	0	0
GRAND TOTAL		393,083					58,225	54,268	3,313	50,955	9,362

a. Further information on individuals involved in these allotments can be obtained in the Albuquerque District Office.

b. Allotments have been numbered as they occur in the grazing area from north to south. See Visual A in back pocket.

c. AMP Status: E= Existing - without major changes; P = Proposed - new or major changes.

d. Class of Livestock with proposed action: C = cattle use; H = horse use; S = sheep and goat use.

e. Number of Pastures and Type of Grazing System with proposed action: RR = Rest Rotation; DR = Deferred Rotation.

f. Season of Use = Periods livestock on the Federal Lands with proposed action.

g. Privileges established according to BLM grazing regulations prior to 1975 resource inventory. On three allotments BLM proposes to eliminate livestock grazing privileges. Livestock grazing privileges on those three allotments prior to 1975 resource inventory are as follows: Molino, 12 AUMs; Rock Ridge, 35 AUMs; San Miguel, 12 AUMs.

h. Forage Capacity AUMs = the current grazing capacity, estimated from the 1975 BLM Resource Inventory data. Column 10 (Wildlife AUMs) subtracted from Column 9 (Forage Capacity) = Column 11 (Livestock AUMs available under the proposal).

i. Includes some suspended non-use imposed before 1975 as well as reductions imposed when wildlife AUMs plus grazing privileges are greater than the 1975 Forage Capacity.

Source: AMP Files for the Proposed Action

Table I-3

SCHEDULE FOR IMPLEMENTING PROPOSED ALLOTMENT MANAGEMENT PLANS

No.	Allotment Name	No.	Allotment Name	No.	Allotment Name
			Year 1		
21	Bama	9	Horn Arroyo	25	Rock Ridge
32	Cerro Colorados	13	Molino	22	San Miguel
1	Continental Divide	8	Ojo de los Pinos	6	Tres Hermanos
5	Dry Springs				
					38,754 Acres
					5,177 Livestock AUMs
			Year 2		
39	Cachulie	26	Los Pinos Arroyo	38	San Luis Community
7	Chiuilla Community	3	Pelon	2	Shroyer
16	Fork Rock Mesa	11	Penistaja	4	Starr
18	Forty-four	28	Piedra Lumbre	15	Valle San Isidro
					83,911 Acres
					12,059 Livestock AUMs
			Year 3		
45	Arroyo Alamito	27	Dry Well	14	Nacimiento
54	Arroyo Piedra Parada	23	Eagle Mesa	37	North San Luis Mesa
10	Brandy	30	Elk Springs	59	Rio Salado Community
31	Canada Candelaria	61	Gypsum Hill	24	Ridge Top
33	Cebo Community	12	Lagunitas	20	San Pablo
41	Cerro Cuate	40	Lost Valley	46	San Ysidro Pasture
43	Chico Crossing	17	Mesa Portales	19	Senorito
29	Coal Creek	58	Mighty Mite	34	Twin Butte
					143,577 Acres
					18,868 Livestock AUMs
			Year 4		
36	Arroyo Empedrado	55	Corrales Tierra	48	Mesa Cortada
42	Azabache	57	Cucho Arroyo	56	Pipeline
52	Banco de la Casa	49	El Banquito	60	Rock House
44	Cabezon Peak	47	Guadalupe Community	51	Salado-Tapia
53	Canon del Camino	50	Ignacio Chavez Grant	35	Torreon Wash
					126,841 Acres
					14,851 Livestock AUMs

Acres and AUMs are shown for public lands only.

Source: Compiled by District Operations Staff from AMP Files for the Proposed Action

Among the 61 proposed allotments, a typical AMP would set such specific objectives as the following, to be accomplished by the year 2000:

Wildlife Habitat

To provide a specified number of AUMs for wildlife; to increase the percentage of oak, fourwing saltbush, mountain mahogany or winterfat by a specific amount; to improve the vigor of shrub live oak from low to medium.

Erosion

To increase the percentage of the allotment that is in a stable erosion condition while decreasing area of critical and severe erosion. Where stable conditions exist, maintenance at that level would be sought.

Livestock Production

To increase the production of forage for livestock by a specified number of AUMs.

Vegetation

To increase the overall ground cover and amounts of various desired species (e.g., western wheatgrass, galleta, Indian ricegrass, alkali sacaton) to a certain percentage.

Range Condition

To increase the percentage of the allotment that is in good condition, while decreasing areas in fair and poor range condition.

Detailed objectives for all 61 proposed allotments are summarized from their respective AMPs in Table I-4.

Grazing Systems

The AMP approach for the Rio Puerco ES Area recognizes grazing systems with emphasis on meeting specific plant requirements for growth (see Visual A in back pocket for grazing systems by pasture). Rest rotation would be employed in 51 allotments containing 370,182 acres of public land. Deferred rotation would be adopted in six allotments containing 22,381 acres of public land. The two systems differ in that rest rotation provides for periodic yearlong rest whereas deferred rotation provides less than yearlong rest.

Grazing management systems with rotation of pastures are designed to rest the range in pursuit of specific results, and would have the combined effect of concentrating livestock on one-third or less of the total public land acreage at any given time.

Total acreage grazed during the course of a year would be approximately 280,830 acres, about 71 percent of the public lands involved. Yearlong rest would be allowed for 112,253 acres, about 29 percent of the public land. Additional rest (less than yearlong) is generally provided pastures before and after the period they are scheduled for grazing (Table I-5).

During rest periods, depending on the seasonal timing, plants make seed, germinate, develop roots and grow into seedlings. In other cases, an extended relief from grazing enables the forage plants to develop vigor and reproduce vegetatively.

Rest Rotation Grazing (370,182 acres)

In rest rotation systems, the range is divided into pastures, each of which is alternately grazed and rested to provide for improving or maintaining the vegetation, soil fertility, and other resource values while at the same time providing forage for livestock (Hormay, 1970). Hormay says the resource values would be maintained and improved almost entirely by timely resting of the range from grazing.

As shown in Table I-5, the 51 rest rotation allotments would be divided into from one to eight pastures each under the proposal. A schedule of resting and grazing the various pastures would be followed through the four seasons and the cycle would be repeated in each allotment after all pastures have received the scheduled grazing treatments. About 29 percent of the public lands involved would receive a year's rest from livestock grazing at a given time, with other acreages receiving briefer rests.

Figure I-1 is a typical version of the grazing systems prepared for 51 allotments in the Rio Puerco ES Area; actual grazing systems usually vary slightly. However, all rest rotation systems are based on the same principles and grazing treatments.

Rest rotation grazing systems can include any number of options, usually called treatments, depending upon goals for that allotment. The goals of each system may differ, affecting the timing and duration of rest-graze periods for a particular grazing area. Types of plant life and climatic variations also influence the choice of treatments.

During the first year, one pasture of a four pasture allotment would be rested yearlong to allow seedlings to become established and to

Table I-4

SPECIFIC OBJECTIVES OF THE PROPOSED ACTION*

By Year 2000

Allotment Name and Number and Acres Public Lands	Wildlife Habitat (Major Game Species)	Erosion Condition Class (% of Allotment Acreage)			Livestock Forage Production On Public Lands	Vegetation (Major Vegetative Sub-Type In Allotment)	Range Condition Class (% of Allotment Acreage)		
		Class	Present	Future			Class	Present	Future
Corrales Tierra 55 784 Acres Public Lands	Provide 6 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 40 42 18 0	36 36 26 2 0	Increase forage production from 68 to 170 AUMs	Increase cover of side-oats grama from 4 to 6%, Indian ricegrass from 1 to 4%, winterfat from 2 to 6%, alkali sacaton from 7 to 12% and four-wing saltbush from 8 to 12% (Pinyon-juniper)	Good Fair Poor	37 45 18	41 41 18
Senorito 19 683 Acres Public Lands	Provide 6 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 50 50 0 0	30 55 15 0 0	Increase forage production for livestock from 96 to 184 AUMs	Increase cover of galleta in pinyon-juniper from 3 to 7% and cover of western wheatgrass in sagebrush from a trace to 4% (Shortgrass)	Good Fair Poor	5 95 0	83 17 0
Mesa Portales 17 1,996 Acres Public Lands	Provide 20 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 32 68 0 0	20 54 26 0 0	Increase forage production for livestock from 330 to 581 AUMs	Increase cover of galleta in treated pinyon-juniper from a trace to 4% and western wheatgrass in big sagebrush from 4 to 6% (Pinyon-juniper)	Good Fair Poor	32 57 11	71 29 0
Nacimiento 14 1,418 Acres Public Lands	Provide 18 AUMs for wildlife Increase cover of oak in pinyon-juniper from a trace to 5% (Deer)	Stable Slight Moderate Critical Severe	0 14 16 70 0	9 17 54 20 0	Increase forage production for livestock from 224 to 394 AUMs	Increase the cover of western wheatgrass from 2 to 7% and galleta from 8 to 13% (Pinyon-juniper)	Good Fair Poor	0 26 74	26 41 33
Ridgetop 24 1,150 Acres Public Lands	Provide 2 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 0 94 0 6	0 59 35 2 4	Increase forage production for livestock from 203 to 284 AUMs	Increase cover of alkali sacaton and western wheatgrass from a trace to 5% (Big Sagebrush)	Good Fair Poor	0 57 43	92 1 7
Salado-Tapia 51 3,183 Acres Public Lands	Provide 12 AUMs for wildlife Increase cover of winterfat from a trace to 3% (Deer and Elk)	Stable Slight Moderate Critical Severe	9 76 15 0 0	61 33 6 0 0	Increase forage production for livestock from 278 to 489 AUMs	Increase cover of galleta from 2 to 5% (Shortgrass)	Good Fair Poor	9 35 56	100 0 0
Arroyo Alamito 45 3,710 Acres Public Lands	Provide 12 AUMs for wildlife Increase cover of four-wing saltbush from a trace to 3% (Antelope)	Stable Slight Moderate Critical Severe	0 75 25 0 0	50 40 10 0 0	Increase forage production for livestock from 738 to 1,492 AUMs	Increase cover of Indian ricegrass from a trace to 2% (Shortgrass)	Good Fair Poor	33 62 5	100 0 0
Arroyo Piedra Parada 54 3,631 Acres Public Lands	Provide 24 AUMs for wildlife Increase cover of four-wing saltbush from 8 to 15% (Antelope and Deer)	Stable Slight Moderate Critical Severe	9 66 25 0 0	25 59 16 0 0	Increase forage production for livestock from 438 to 771 AUMs	Increase cover of galleta from 2 to 7% and Indian ricegrass from a trace to 5% (Pinyon-juniper)	Good Fair Poor	73 15 12	75 25 0
Cachulie 39 10,136 Acres Public Lands	Provide 150 AUMs for wildlife Increase cover of four-wing saltbush from 1 to 4% (Antelope)	Stable Slight Moderate Critical Severe	3 96 1 0 0	91 8 1 0 0	Increase forage production for livestock from 1,593 to 2,804 AUMs	Increase cover of Indian ricegrass from 7 to 14%, galleta from 6 to 10%, winterfat from 2 to 6%, western wheatgrass from 1 to 4% (Shortgrass)	Good Fair Poor	70 29 1	99 1 0

Allotment Name and Number and Acres Public Lands	Wildlife Habitat (Major Game Species)	Erosion Condition Class (% of Allotment Acreage)			Livestock Forage Production On Public Lands	Vegetation (Major Vegetative Sub-Type In Allotment)	Range Condition Class (% of Allotment Acreage)		
		Class	Present	Future			Class	Present	Future
Cebo Community 33 7,280 Acres Public Lands	Provide 30 AUMs for wildlife Increase cover of four-wing saltbush from 2 to 5% (Antelope)	Stable Slight Moderate Critical Severe	0 90 2 8 0	36 55 3 6 0	Increase forage production for livestock from 1,308 to 2,303 AUMs	Increase cover of alkali sacaton from 9 to 14% and galleta from 14 to 20% (Four-wing saltbush)	Good Fair Poor	0 81 19	82 18 0
Coal Creek 29 5.268 Acres Public Lands	Provide 27 AUMs for wildlife Increase cover of mountain mahogany from a trace to 2% (Deer and Elk)	Stable Slight Moderate Critical Severe	0 21 57 21 1	15 56 23 5 1	Increase forage production for livestock from 641 to 1,128 AUMs	Increase cover of Indian ricegrass from a trace to 3%, galleta from 1 to 5%, alkali sacaton from 8 to 14% and four-wing saltbush from a trace to 3% (Pinyon-juniper)	Good Fair Poor	9 69 22	51 42 7
El Banquito 49 14,725 Acres Public Lands	Provide 111 AUMs for wildlife Improve browse vigor in winter range areas from low to medium Increase browse cover in winter range from 5 to 20% (Deer, Elk and Turkey)	Stable Slight Moderate Critical Severe	40 27 32 1 0	60 33 6 1 0	Increase forage production for livestock from 1,563 to 3,230 AUMs	Increase cover of Indian ricegrass from 1 to 5%, alkali sacaton from a trace to 7% and western wheatgrass from 1 to 3% (Pinyon-juniper)	Good Fair Poor	51 48 1	100 0 0
Fork Rock Mesa 16 800 Acres Public Lands	Provide 1 AUM for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 33 66 0 1	22 50 27 0 1	Increase forage production for livestock from 65 to 114 AUMs	Increase cover of galleta from 3 to 5% in both treated and untreated big sagebrush and western wheatgrass in treated pinyon-juniper from 2 to 6% (Pinyon-juniper)	Good Fair Poor	33 66 1	86 13 1
Forty-four 18 2,484 Acres Public Lands	Provide 10 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 54 46 0 0	30 49 21 0 0	Increase forage production for livestock from 489 to 861 AUMs	Increase cover of galleta from 2 to 6%, Indian ricegrass from 1 to 3% and western wheatgrass from 3 to 5% (Big sagebrush)	Good Fair Poor	12 88 0	94 6 0
Gypsum Hill 61 4,434 Acres Public Lands	Provide 20 AUMs for wildlife Increase cover of four-wing saltbush from 3 to 6% in pinyon-juniper and from 27 to 35% in four-wing saltbush (Deer)	Stable Slight Moderate Critical Severe	0 25 44 30 1	16 31 43 9 1	Increase forage production for livestock from 262 to 770 AUMs	Increase cover of galleta from 1 to 4% in pinyon-juniper and alkali sacaton from 4 to 8% in big sagebrush (Shortgrass)	Good Fair Poor	7 44 49	49 25 26
Lagunitas 12 1,467 Acres Public Lands	Provide 12 AUMs for wildlife Increase cover of mountain mahogany and oak in ponderosa pine from a trace amount to 5% by reducing forage competition between livestock and wildlife (Deer)	Stable Slight Moderate Critical Severe	0 47 53 0 0	26 45 29 0 0	Increase forage production for livestock from 159 to 280 AUMs	Increase cover of galleta in pinyon-juniper from 3 to 10% and western wheatgrass from a trace amount to 5% (Pinyon-juniper)	Good Fair Poor	0 95 5	92 5 3
Ojo de los Pinos 8 5,685 Acres Public Lands	Provide 34 AUMs for wildlife Improve big game habitat from an unsatisfactory condition (Deer)	Stable Slight Moderate Critical Severe	0 80 14 0 6	60 29 5 2 4	Increase forage production for livestock from 995 to 1,751 AUMs	Increase galleta cover from 3 to 8% and western wheatgrass from 2 to 7% (Big sagebrush)	Good Fair Poor	78 20 2	98 0 2

Table I-4 (continued)

Page 3 of 7 Pages

Allotment Name and Number and Acres Public Lands	Wildlife Habitat (Major Game Species)	Erosion Condition Class (% of Allotment Acreage)			Livestock Forage Production On Public Lands	Vegetation (Major Vegetative Sub-Type In Allotment)	Range Condition Class (% of Allotment Acreage)		
		Class	Present	Future			Class	Present	Future
Pelon 3 8,197 Acres Public Lands	Provide 11 AUMs for wildlife Increase deer winter range by seeding browse (Deer and Antelope)	Stable Slight Moderate Critical Severe	0 3 87 10 0	3 67 26 4 0	Increase forage production for livestock from 793 to 1,896 AUMs	Increase cover of western wheatgrass from a trace to 5% and galleta from 3 to 8% (Big sagebrush)	Good Fair Poor	0 90 10	80 12 8
San Pablo 20 2,753 Acres Public Lands	Provide 60 AUMs for wildlife (Deer and Elk)	Stable Slight Moderate Critical Severe	0 30 70 0 0	22 38 40 0 0	Increase forage production for livestock from 400 to 704 AUMs	Increase cover of alkali sacaton from a trace to 5% and western wheatgrass from a trace to 8% (Pinyon-juniper)	Good Fair Poor	0 59 41	65 35 0
Shroyer 2 4,573 Acres Public Lands	Provide 12 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 67 33 0 0	56 40 4 0 0	Increase forage production for livestock from 743 to 1,308 AUMs	Increase cover of western wheatgrass in pinyon-juniper from a trace to 2% and in pinyon-juniper treated from 3 to 6% (Pinyon-juniper)	Good Fair Poor	59 41 0	86 14 0
Arroyo Empedrado 36 3,507 Acres Public Lands	Provide 18 AUMs for wildlife Improve vigor of shrub live oak from low to medium (Deer)	Stable Slight Moderate Critical Severe	0 13 81 6 0	8 45 42 5 0	Increase forage production for livestock from 472 to 831 AUMs	Increase cover of western wheatgrass from 4 to 8% and cover of four-wing saltbush from 7 to 10% (Shortgrass)	Good Fair Poor	0 43 57	47 47 6
Azabache 42 17,298 Acres Public Lands	Provide 30 AUMs for wildlife Increase cover of four-wing saltbush from a trace to 4% (Deer)	Stable Slight Moderate Critical Severe	9 44 46 1 0	43 50 7 0 0	Increase forage production for livestock from 2,081 to 3,663 AUMs	Increase cover of alkali sacaton from 1-4 to 5-12%, galleta from 10-13 to 15-19% and black grama from 4 to 7% (Shortgrass)	Good Fair Poor	29 62 9	75 25 0
Banco de la Casa 52 4,857 Acres Public Lands	Provide 25 AUMs for wildlife Increase cover of winterfat from a trace to 3% (Deer)	Stable Slight Moderate Critical Severe	24 41 35 0 0	31 54 15 0 0	Increase forage production for livestock from 499 to 878 AUMs	Increase cover of galleta from a trace to 5%, Indian ricegrass from a trace to 2%, black grama from 5 to 9% in shortgrass and black grama in pinyon-juniper from a trace to 2% (Shortgrass)	Good Fair Poor	22 68 10	84 12 4
Cabezon Peak 44 11,139 Acres Public Lands	Provide 34 AUMs for wildlife Increase cover of four-wing saltbush from a trace to 5% (Deer)	Stable Slight Moderate Critical Severe	0 53 47 0 0	27 56 17 0 0	Increase forage production for livestock from 1,523 to 2,908 AUMs	Increase cover of western wheatgrass from a trace to 5%, winterfat from a trace to 5%, galleta from 8 to 12% and alkali sacaton from 11 to 18% (Shortgrass)	Good Fair Poor	29 70 1	59 40 1
Canon del Camino 53 4,943 Acres Public Lands	Provide 37 AUMs for wildlife Increase cover of four-wing saltbush from 9 to 15% (Deer)	Stable Slight Moderate Critical Severe	0 0 92 8 0	0 32 66 2 0	Increase forage production for livestock from 460 to 810 AUMs	Increase cover of side-oats grama from 3 to 5%, Indian ricegrass from 2 to 4%, winterfat from 2 to 6%, alkali sacaton from 4 to 8% (Pinyon-juniper)	Good Fair Poor	0 38 62	27 23 50
Cerro Cuate 41 2,606 Acres Public Lands	Provide 24 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 1 89 9 1	1 69 25 4 1	Increase forage production for livestock from 412 to 725 AUMs	Increase cover of alkali sacaton from 5 to 9%, galleta from 5 to 10%, four-wing saltbush from 2 to 4% and western wheatgrass from 1 to 3% (Shortgrass)	Good Fair Poor	1 89 10	57 37 6

Allotment Name and Number and Acres Public Lands	Wildlife Habitat (Major Game Species)	Erosion Condition Class (% of Allotment Acreage)			Livestock Forage Production On Public Lands	Vegetation (Major Vegetative Sub-Type In Allotment)	Range Condition Class (% of Allotment Acreage)		
		Class	Present	Future			Class	Present	Future
Cucho Arroyo 57 4,615 Acres Public Lands	Provide 16 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 20 80 0 0	16 67 17 0 0	Increase forage production for livestock from 420 to 739 AUMs	Increase cover of galleta from 3 to 6%, black grama from a trace to 2%, four-wing saltbush from 1 to 4% and alkali sacaton from 11 to 15% (Pinyon-juniper)	Good Fair Poor	0 88 12	19 78 3
Dry Well 27 9,564 Acres Public Lands	Provide 12 AUMs for wildlife (Deer and Antelope)	Stable Slight Moderate Critical Severe	0 26 74 0 0	20 53 27 0 0	Increase forage production for livestock from 1,013 to 1,783 AUMs	Increase cover of galleta from 4 to 7%, western wheatgrass from a trace to 5%, and Indian ricegrass from a trace to 5% (Pinyon-juniper)	Good Fair Poor	25 39 36	63 26 11
Horn Arroyo 9 4,757 Acres Public Lands	Provide 12 AUMs for wildlife (Antelope)	Stable Slight Moderate Critical Severe	0 29 67 4 0	21 68 9 2 0	Increase forage production for livestock from 655 to 913 AUMs	Increase cover of galleta from a trace to 5%, alkali sacaton from a trace to 5%, and western wheatgrass from a trace to 5% (Big sagebrush)	Good Fair Poor	29 67 4	41 56 3
Lost Valley 40 11,377 Acres Public Lands	Provide 150 AUMs for wildlife Increase cover from 10 to 15% in four-wing saltbush (Antelope)	Stable Slight Moderate Critical Severe	0 69 30 1 0	48 41 10 1 0	Increase forage production for livestock from 2,358 to 4,150 AUMs	Increase cover of Indian ricegrass from a trace to 2% in shortgrass and black grama from a trace to 2% in broom snakeweed (Shortgrass)	Good Fair Poor	69 30 1	90 9 1
Mesa Cortada 48 6,252 Acres Public Lands	Provide 23 AUMs for wildlife (Deer and Antelope)	Stable Slight Moderate Critical Severe	20 26 50 4 0	36 44 18 2 0	Increase forage production for livestock from 605 to 1,544 AUMs	Increase cover of galleta from 2 to 6% and four-wing saltbush from 1 to 6% (Shortgrass)	Good Fair Poor	24 72 4	46 53 1
North San Luis Mesa 37 4,187 Acres Public Lands	Provide 34 AUMs for wildlife Increase cover of shadscale from 1 to 3% and winterfat from a trace to 3% (Deer and Antelope)	Stable Slight Moderate Critical Severe	0 62 36 2 0	40 52 7 1 0	Increase forage production for livestock from 522 to 919 AUMs	Increase cover of western wheatgrass from a trace to 3% and Indian ricegrass from 1 to 5% (Shortgrass)	Good Fair Poor	62 30 8	76 24 0
Pipeline 56 10,860 Acres Public Lands	Provide 83 AUMs for wildlife (Deer and Antelope)	Stable Slight Moderate Critical Severe	16 47 29 8 0	52 22 20 6 0	Increase forage production for livestock from 1,748 to 2,932 AUMs	Increase cover of Indian ricegrass from a trace to 2%, galleta from 4 to 7% and alkali sacaton from 6 to 9% (Shortgrass)	Good Fair Poor	43 43 14	65 30 5
Rio Salado Community 59 9,063 Acres Public Lands	Provide 24 AUMs for wildlife Increase cover of mountain mahogany in the western portion of the allotment from 2 to 4% (Deer)	Stable Slight Moderate Critical Severe	0 33 58 2 7	20 54 18 4 4	Increase forage production for livestock from 772 to 1,388 AUMs	Increase cover of black grama in pinyon-juniper from 2 to 4% and Indian ricegrass in the bottomland sites from 1 to 3% (Pinyon-juniper)	Good Fair Poor	15 72 13	33 60 7

Allotment Name and Number and Acres Public Lands	Wildlife Habitat (Major Game Species)	Erosion Condition Class (% of Allotment Acreage)			Livestock Forage Production On Public Lands	Vegetation (Major Vegetative Sub-Type In Allotment)	Range Condition Class (% of Allotment Acreage)		
		Class	Present	Future			Class	Present	Future
Rock House 60 8,743 Acres Public Lands	Provide 30 AUMs for wildlife Maintain 27% cover of four-wing saltbush and improve vigor from fair to good (Deer)	Stable Slight Moderate Critical Severe	0 5 95 0 0	4 62 34 0 0	Increase forage production for livestock from 976 to 1,765 AUMs	Increase cover of black grama in pinyon-juniper from 1 to 3% and galleta in pinyon-juniper from 1 to 5% (Shortgrass)	Good Fair Poor	0 97 3	56 41 3
San Luis Community 38 5,039 Acres Public Lands	Provide 19 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 48 52 0 0	32 51 17 0 0	Increase forage production for livestock from 897 to 1,579 AUMs	Increase cover of galleta from 7 to 12% and alkali sacaton from 5 to 10% (Pinyon-juniper)	Good Fair Poor	7 86 7	69 31 0
San Ysidro Pasture 46 5,490 Acres Public Lands	Provide 12 AUMs for wildlife Increase cover of winterfat from 3 to 6% (Antelope)	Stable Slight Moderate Critical Severe	0 2 98 0 0	0 75 25 0 0	Increase forage production for livestock from 744 to 1,480 AUMs	Increase cover of galleta from 4 to 8% and cover of Indian ricegrass from 2 to 5% (Shortgrass)	Good Fair Poor	0 98 2	86 14 0
Valle San Isidro 15 4,723 Acres Public Lands	Provide 16 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 86 11 3 0	65 28 6 1 0	Increase forage production for livestock from 314 to 472 AUMs	Increase cover of galleta from 2 to 7% and Indian ricegrass from 3 to 8% (Big sagebrush)	Good Fair Poor	31 62 7	93 5 2
Chico Crossing 43 13,063 Acres Public Lands	Provide 185 AUMs for wildlife Increase vigor of cliffrose from fair to good Increase cover of gambel oak from 14 to 20% (Deer and Elk)	Stable Slight Moderate Critical Severe	3 24 70 3 0	23 56 20 1 0	Increase forage production for livestock from 1,555 to 2,737 AUMs	Increase cover of alkali sacaton from 4 to 15% and four-wing saltbush from 21 to 26% (Shortgrass)	Good Fair Poor	5 44 51	27 71 2
Continental Divide 1 10,270 Acres Public Lands	Provide 84 AUMs for wildlife Reduce livestock use on bitterbrush to 20% (Deer)	Stable Slight Moderate Critical Severe	0 20 79 0 1	14 67 18 0 1	Increase forage production for livestock from 1,510 to 2,645 AUMs	Increase cover of western wheatgrass from 5 to 8% and alkali sacaton from 5 to 8% (Big sagebrush)	Good Fair Poor	7 57 36	58 41 1
Dry Springs 5 6,056 Acres Public Lands	Provide 17 AUMs for wildlife Increase cover of bitterbrush from 1 to 3% (Deer)	Stable Slight Moderate Critical Severe	0 23 73 1 3	19 54 23 3 1	Increase forage production for livestock from 820 to 1,496 AUMs	Increase cover of western wheatgrass from 2 to 4%, crested wheatgrass from 6 to 9% and Indian ricegrass from a trace to 2% (Pinyon-juniper)	Good Fair Poor	10 80 10	77 16 7
Eagle Mesa 23 12,550 Acres Public Lands	Provide 36 AUMs for wildlife (Deer and Antelope)	Stable Slight Moderate Critical Severe	0 41 47 12 0	21 50 24 5 0	Increase forage production for livestock from 1,628 to 2,847 AUMs	Increase cover of galleta from 4 to 7%, western wheatgrass from 1 to 3%, crested wheatgrass from 3 to 6%, Indian ricegrass from a trace to 3%, alkali sacaton from 10 to 15% and Junegrass from a trace to 2% (Pinyon-juniper)	Good Fair Poor	6 70 24	58 33 9
Guadalupe Community 47 6,455 Acres Public Lands	Provide 24 AUMs for wildlife Increase cover of fringed sage from 3 to 6% Increase cover of four-wing saltbush from 5 to 10% (Deer and Antelope)	Stable Slight Moderate Critical Severe	8 67 13 12 0	48 32 17 3 0	Increase forage production for livestock from 693 to 1,220 AUMs	Increase cover of black grama from 3 to 6%, galleta from 8 to 12%, and winterfat from 2 to 5% (Shortgrass)	Good Fair Poor	71 21 8	79 21 0

Allotment Name and Number and Acres Public Lands	Wildlife Habitat (Major Game Species)	Erosion Condition Class (% of Allotment Acreage)			Livestock Forage Production On Public Lands	Vegetation (Major Vegetative Sub-Type In Allotment)	Range Condition Class (% of Allotment Acreage)		
		Class	Present	Future			Class	Present	Future
Penistaja 11 19,619 Acres Public Lands	Provide 47 AUMs for wildlife Increase vigor of mountain mahogany and oak from medium to high by minimizing livestock/wildlife competition for forage (Deer and Antelope)	Stable Slight Moderate Critical Severe	46 46 4 0 4	66 28 2 1 3	Increase forage production for livestock from 3,144 to 5,533 AUMs	Increase cover of western wheatgrass in pinyon-juniper from 2 to 5% and alkali sacaton in big sagebrush from 2 to 6% (Big sagebrush)	Good Fair Poor	60 34 6	75 19 6
Piedra Lumbre 28 4,140 Acres Public Lands	Provide 52 AUMs for wildlife (Deer and Antelope)	Stable Slight Moderate Critical Severe	3 45 28 22 2	34 30 23 12 1	Increase forage production for livestock from 621 to 1,093 AUMs	Increase cover of galleta from a trace to 2%, and Indian ricegrass from a trace to 3% (Pinyon-juniper)	Good Fair Poor	16 60 24	73 27 0
Torreon Wash 35 4,812 Acres Public Lands	Provide 36 AUMs for wildlife Maintain cover of oak species at 5% and increase vigor (Deer)	Stable Slight Moderate Critical Severe	0 15 42 43 0	6 39 49 6 0	Increase forage production for livestock from 594 to 801 AUMs	Increase cover of alkali sacaton in the shortgrass from 7 to 14% and Indian ricegrass in pinyon-juniper from 1 to 4% (Pinyon-juniper)	Good Fair Poor	10 40 50	16 38 46
Twin Butte 34 10,628 Acres Public Lands	Provide 40 AUMs for wildlife (Deer and Antelope)	Stable Slight Moderate Critical Severe	0 34 47 18 1	30 34 23 12 1	Increase forage production for livestock from 921 to 1,621 AUMs	Increase cover of Indian ricegrass from a trace to 2% and alkali sacaton from 11 to 16% (Pinyon-juniper)	Good Fair Poor	8 88 4	77 20 3
Brandy 10 22,368 Acres Public Lands	Provide 140 AUMs for wildlife Increase cover of four-wing saltbush from 1-2 to 4% (Deer, Elk and Antelope)	Stable Slight Moderate Critical Severe	0 23 58 17 2	13 50 31 5 1	Increase forage production for livestock from 3,215 to 5,588 AUMs	Increase cover of western wheatgrass from 1 to 6%, galleta from 1-3 to 5-11%, Indian ricegrass from 1 to 4%, alkali sacaton from 4 to 8% and winterfat from 2 to 3% (Pinyon-juniper)	Good Fair Poor	14 40 46	50 25 25
Starr 4 12,787 Acres Public Lands	Provide 20 AUMs for wildlife (Deer)	Stable Slight Moderate Critical Severe	0 34 49 15 2	15 38 40 6 1	Increase forage production for livestock from 1,514 to 2,812 AUMs	Increase cover of western wheatgrass from 1 to 3% in the treated big sagebrush and alkali sacaton from 1 to 4% (Big sagebrush)	Good Fair Poor	13 68 19	66 18 16
Ignacio Chavez Grant 50 24,668 Acres Public Lands	Provide 1,084 AUMs for wildlife Maintain vigor of four-wing saltbush and increase cover of the species from 11 to 13% Increase browse cover in winter range from 15 to 20% (Deer, Elk and Antelope)	Stable Slight Moderate Critical Severe	32 43 25 0 0	32 43 25 0 0	Increase forage production for livestock from 2,844 to 5,005 AUMs	Increase the cover of galleta in pinyon-juniper from 2 to 5% and increase the cover of western wheatgrass in shortgrass from 2 to 5% (Pinyon-juniper)	Good Fair Poor	68 31 1	88 11 1
Chiuilla Community 7 9,389 Acres Public Lands	Provide 96 AUMs for wildlife Increase cover of mountain mahogany from 6 to 10% (Deer)	Stable Slight Moderate Critical Severe	0 61 31 8 0	41 40 14 5 0	Increase forage production for livestock from 1,828 to 3,235 AUMs	Increase cover of crested wheatgrass from 2 to 6%, galleta from 2 to 5%, Indian ricegrass from a trace to 3% and alkali sacaton from a trace to 3% (Pinyon-juniper)	Good Fair Poor	51 34 15	81 19 0

Allotment Name and Number and Acres Public Lands	Wildlife Habitat (Major Game Species)	Erosion Condition Class (% of Allotment Acreage)			Livestock Forage Production On Public Lands	Vegetation (Major Vegetative Sub-Type In Allotment)	Range Condition Class (% of Allotment Acreage)		
		Class	Present	Future			Class	Present	Future
Elk Springs 30 2,561 Acres Public Lands	Provide 99 AUMs for wildlife Increase the cover of mountain mahogany from 1 to 3% (Deer and Elk)	Stable	0	16	Increase forage production for livestock from 168 to 296 AUMs	Increase the cover of western wheatgrass from 2 to 5% and Indian ricegrass from 1 to 3% (Pinyon-juniper)	Good	12	37
		Slight	28	26			Fair	48	25
		Moderate	34	41			Poor	40	38
		Critical	38	17					
		Severe	0	0					
Mighty Mite 58 1,111 Acres Public Lands	Provide 5 AUMs for wildlife (Deer)	Stable	0	0	Increase forage production for livestock from 125 to 253 AUMs	Increase the cover of galleta from 3 to 6% and alkali sacaton from 3 to 6% (Pinyon-juniper)	Good	0	0
		Slight	0	56			Fair	76	76
		Moderate	88	38			Poor	24	24
		Critical	12	6					
		Severe)	0	0					
Tres Hermanos 6 3,416 Acres Public Lands	Provide 30 AUMs for wildlife Increase cover of gambel oak in the pinyon-juniper type from 1 to 3% (Deer)	Stable	0	60	Increase forage production for livestock from 657 to 1,192 AUMs	Increase cover of western wheatgrass in pinyon-juniper from 1 to 2% and crested wheatgrass in treated big sagebrush from 7 to 10% (Pinyon-juniper)	Good	50	83
		Slight	99	40			Fair	50	17
		Moderate	1	0			Poor	0	0
		Critical	0	0					
		Severe	0	0					
Canada Candelaria 31 5,219 Acres Public Lands	Provide 27 AUMs for wildlife (Deer and Antelope)	Stable	0	5	Increase forage production for livestock from 636 to 1,119 AUMs	Increase cover of western wheatgrass from 4 to 8% and winterfat from 9 to 15% (Pinyon-juniper)	Good	7	61
		Slight	12	69			Fair	57	37
		Moderate	88	26			Poor	36	2
		Critical	0	0					
		Severe	0	0					
Los Pinos Arroyo 26 2,024 Acres Public Lands	Provide 75 AUMs for wildlife Maintain cover of gambel oak at 4% and increase mountain mahogany from a trace to 3% (Deer and Elk)	Stable	0	0	Increase forage production for livestock from 101 to 178 AUMs	Increase cover of western wheatgrass in pinyon-juniper from 8 to 12% (Pinyon-juniper)	Good	0	68
		Slight	0	34			Fair	42	32
		Moderate	83	49			Poor	58	0
		Critical	0	2					
		Severe	17	15					
Cerro Colorados 32 8,050 Acres Public Lands	Provide 33 AUMs for wildlife Increase cover of four-wing saltbush from 1 to 2% (Deer and Antelope)	Stable	0	19	Increase forage production for livestock from 540 to 950 AUMs	Increase cover of alkali sacaton from 4 to 8%, galleta from 2 to 6%, winterfat from 3 to 5% and western wheatgrass from 3 to 6% (Pinyon-juniper)	Good	25	42
		Slight	26	40			Fair	52	58
		Moderate	53	29			Poor	23	0
		Critical	20	11					
		Severe	1	1					
Bama 21 96 Acres Public Lands	Provide 7 AUMs for wildlife (Deer and Elk)	Stable	0	0	No livestock production	Increase total** cover from 67 to 77% (Pinyon-juniper)	Good	0	0
		Slight	0	0			Fair	0	31
		Moderate	0	80			Poor	100	69
		Critical	100	20					
		Severe	0	0					
Molino 13 80 Acres Public Lands	Provide 5 AUMs for wildlife (Deer)	Stable	0	0	No livestock production	Increase total** cover from 48 to 60% (Pinyon-juniper)	Good	0	0
		Slight	0	0			Fair	0	100
		Moderate	0	60			Poor	100	0
		Critical	100	40					
		Severe	0	0					
Rock Ridge 25 264 Acres Public Lands	Provide 17 AUMs for wildlife (Deer and Elk)	Stable	0	0	No livestock production	Increase total** cover from 68 to 78% (Pinyon-juniper)	Good	0	10
		Slight	0	0			Fair	12	82
		Moderate	0	0			Poor	88	8
		Critical	0	60					
		Severe	100	40					
San Miguel 22 80 Acres Public Lands	Provide 6 AUMs for wildlife (Deer and Elk)	Stable	0	0	No livestock production	Increase total** cover from 67 to 77% (Big sagebrush)	Good	0	0
		Slight	0	30			Fair	50	50
		Moderate	100	70			Poor	50	50
		Critical	0	0					
		Severe	0	0					

*Most objectives are taken directly from AMPs; however, there are summarizations in those cases where there is more than one objective for a specific plant species.

**Total cover includes total vegetation, litter and rocks.

Source: AMP Files for the Proposed Action

Table I-5

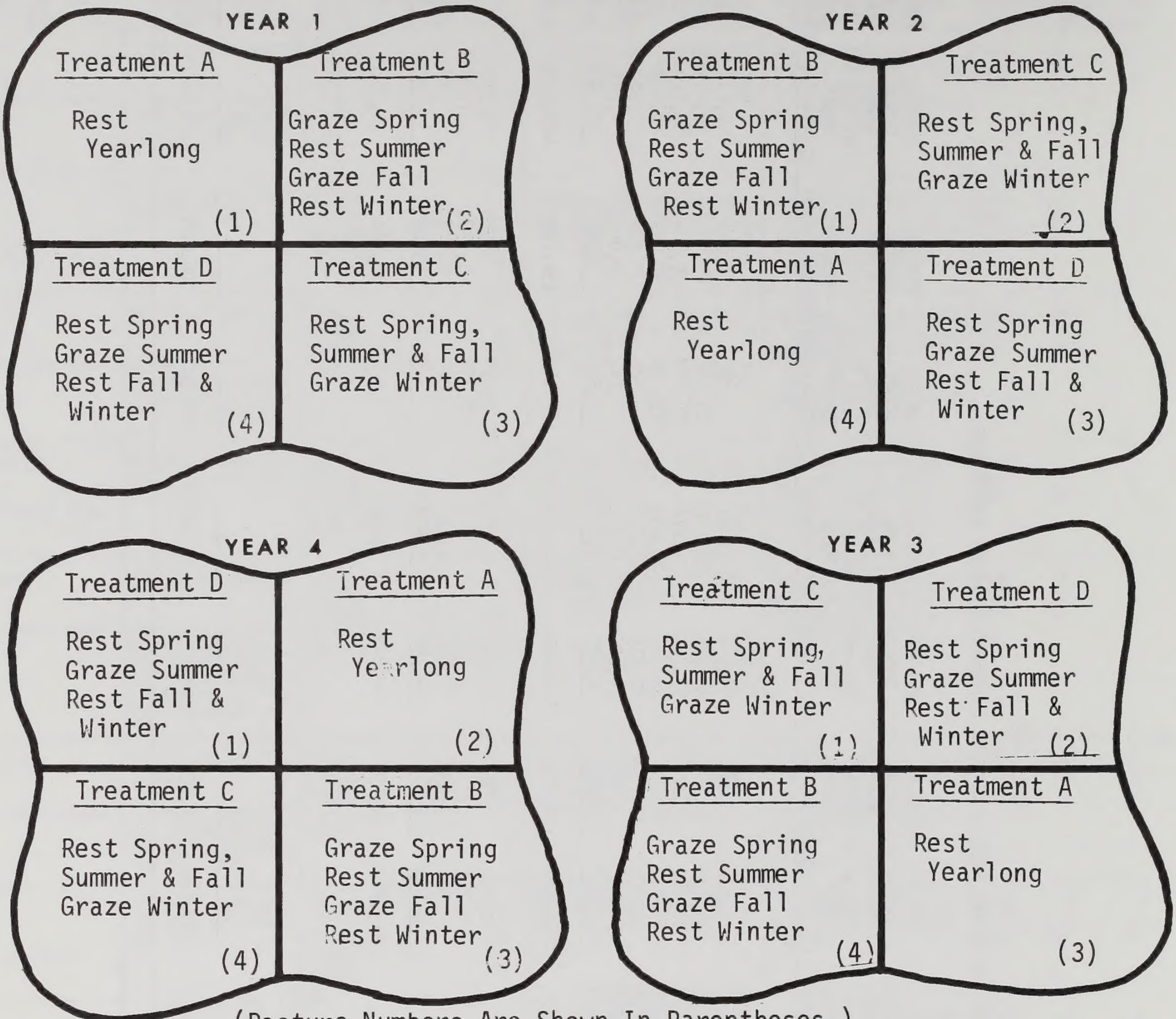
ACRES RESTED OR GRAZED EACH YEAR WITH INTENSIVE GRAZING MANAGEMENT

Grazing System	Number of Allotments	Public Lands Total Acres	Public Lands Acres Yearlong Rest[a]	Public Lands Acres Spring Rest (3/1-6/30)	Public Lands Acres Spring Graze (3/1-6/30)	Public Lands Acres Summer Rest (7/1-10/15)	Public Lands Acres Summer Graze (7/1-10/15)	Public Lands Acres Fall Rest[b] (10/16-11/30)	Public Lands Acres Fall Graze[b] (10/16-11/30)	Public Lands Acres Winter Rest[b] (12/1-2/28)	Public Lands Acres Winter Graze[b] (12/1-2/28)
Rest Rotation											
1 Pasture	2	1,467	562	749	156	593	312	535	370	537	368
2 Pasture	4	7,747	3,107	2,242	2,398	3,579	1,061	2,386	2,254	1,698	2,942
3 Pasture	14	75,143	23,979	28,895	22,269	37,978	13,186	23,248	27,916	20,725	30,439
4 Pasture	18	129,020	37,024	58,989	33,007	59,720	32,276	56,492	35,504	59,379	32,617
5 Pasture	9	87,593	28,299	30,772	28,522	30,613	28,681	25,220	34,074	21,949	37,345
6 Pasture	2	35,155	11,718	11,718	11,719	11,719	11,718	9,583	13,854	9,588	13,849
7 Pasture	1	24,668	3,524	14,097	7,047	14,802	6,342	7,143	14,001	7,047	14,097
8 Pasture	1	9,389	3,520	2,557	3,312	4,695	1,174	2,563	3,306	2,350	3,519
TOTAL	51	370,182	111,733	150,019	108,430	163,699	94,750	127,170	131,279	123,273	135,176
Deferred Rotation											
2 Pasture	2	3,672		2,707	965	2,393	1,279	3,117	555	3,110	562
3 Pasture	1	3,416		2,278	1,138	3,416	0	2,278	1,138	1,138	2,278
4 Pasture	2	7,243		3,306	3,937	4,633	2,610	2,025	5,218	504	6,739
5 Pasture	1	8,050		5,636	2,414	4,141	3,909	0	8,050	0	8,050
TOTAL	6	22,381		13,927	8,454	14,583	7,798	7,420	14,961	4,752	17,629
Other											
Unallotted	1	96	96								
To Wildlife[c]	3	424	424								
TOTAL	4	520	520								
GRAND TOTAL	61	393,083	112,253	163,946	116,884	178,282	102,548	134,590	146,240	128,025	152,805

a. Average number of acres which receive yearlong rest.
b. Dormant period for key species.
c. Livestock use eliminated. All AUMs to wildlife.

Source: AMP Files for the Proposed Action

FIGURE I-1 FOUR YEAR REST ROTATION GRAZING SYSTEM



(Pasture Numbers Are Shown In Parentheses.)

Treatment A -	Rest yearlong to allow all species including browse to gain vigor. Litter would be produced and seedlings would be given time to become established. Species that reproduce vegetatively would be allowed to do so.
Treatment B -	Graze during spring to harvest forage produced the previous summer and plant any seeds that remain. This is followed by summer rest to allow warm season species to gain vigor and produce seeds. Fall grazing would ensure seed implantation. This is followed by winter rest, for browse.
Treatment C -	Rest spring, summer and fall to allow both cool and warm season species to gain vigor and produce seeds. The species that reproduce vegetatively would also have the time to do so. This is followed by winter grazing to plant both warm and cool season seeds.
Treatment D -	Rest in the spring to allow cool season species to gain vigor and produce seeds. Graze during summer to implant seeds of cool season species, then rest fall to allow these species to become established. This would be followed by winter rest to allow browse species to start a long period of rest (16½ months).

allow for vegetative reproduction (see Figure I-1). This would also allow litter to accumulate and thereby protect the soil from erosive action. During this period, browse plants would complete a sixteen and one-half month rest period to ensure their vigor and reproduction. In the second year, the pasture would be grazed in the spring to harvest AUMs produced the preceding year and plant any seeds that remain. Summer rest is then provided for warm season species to gain vigor and produce seeds. This is followed by grazing in the fall so that trampling would assure seed implantation. Winter rest would follow the planting of seeds. During the third year, spring, summer and fall rest is provided to allow those species planted the previous fall a chance to become established seedlings, and for vegetative reproduction to take place. This would be followed with winter grazing to harvest AUMs produced during the growing season of that year. During the fourth year the pasture would be rested in the spring to allow the cool season species to increase in vigor and produce seeds. Summer grazing would then take place to implant seeds of these species through trampling. Fall and winter rest would follow to allow cool season plants to become established and start sixteen and one-half month rest period for browse species.

The other pastures in the allotment, meanwhile, would undergo the same treatments in different parts of the cycle allowing one pasture always to be well-rested and established with forage in time to assure the major grazing load of the next year. As each pasture progresses through the cycle range conditions would improve and erosion would decrease. Wildlife habitat would improve as shrubs are given the chance to rest and gain vigor.

Deferred Rotation Grazing (22,381 acres)

In deferred rotation grazing, a pasture is grazed for three to four months. The livestock are then moved off and the pasture is rested from livestock grazing during the remainder of the growing season. This provides the opportunity for the plants to produce seed, establish seedlings and vigor, and accumulate litter (Hickey, 1966).

As shown in Table I-5, the proposal calls for division of the six allotments scheduled for this system into two to five pastures each. Yearlong rest is not required in any pasture under deferred rotation. A deferred rotation cycle is shown in Figure I-2.

No Livestock Grazing (424 acres)

A total of 424 acres of public lands with 28 AUMs of forage (Rock Ridge, 17 AUMs; Molino, 5 AUMs; and San Miquel, 6 AUMs) would be devoted to wildlife use. Because the areas are not fenced off from private lands, exchange of use agreements would be used to ensure wildlife AUMs are reserved. These allotments are in fair or poor condition and are located in a critical erosion area which also is a significant deer and elk winter range. The 1975 BLM Resource Inventory left no forage available for livestock in those allocations after provision for wildlife had been made.

Unallotted (96 acres)

A fourth allotment (Bama) would be left ungrazed by livestock and would have its unallotted status continued under the proposal. The area is not fenced but under the proposal a fence would be built around this 96 acres to ensure no livestock use. This 96 acres of public lands with seven AUMs of forage, would be used as a study area, and its AUMs devoted to watershed and wildlife purposes. Like the three wildlife allotments, the Bama has critical erosion, is in poor range condition and is in an important elk and deer wintering area.

Progress Checks

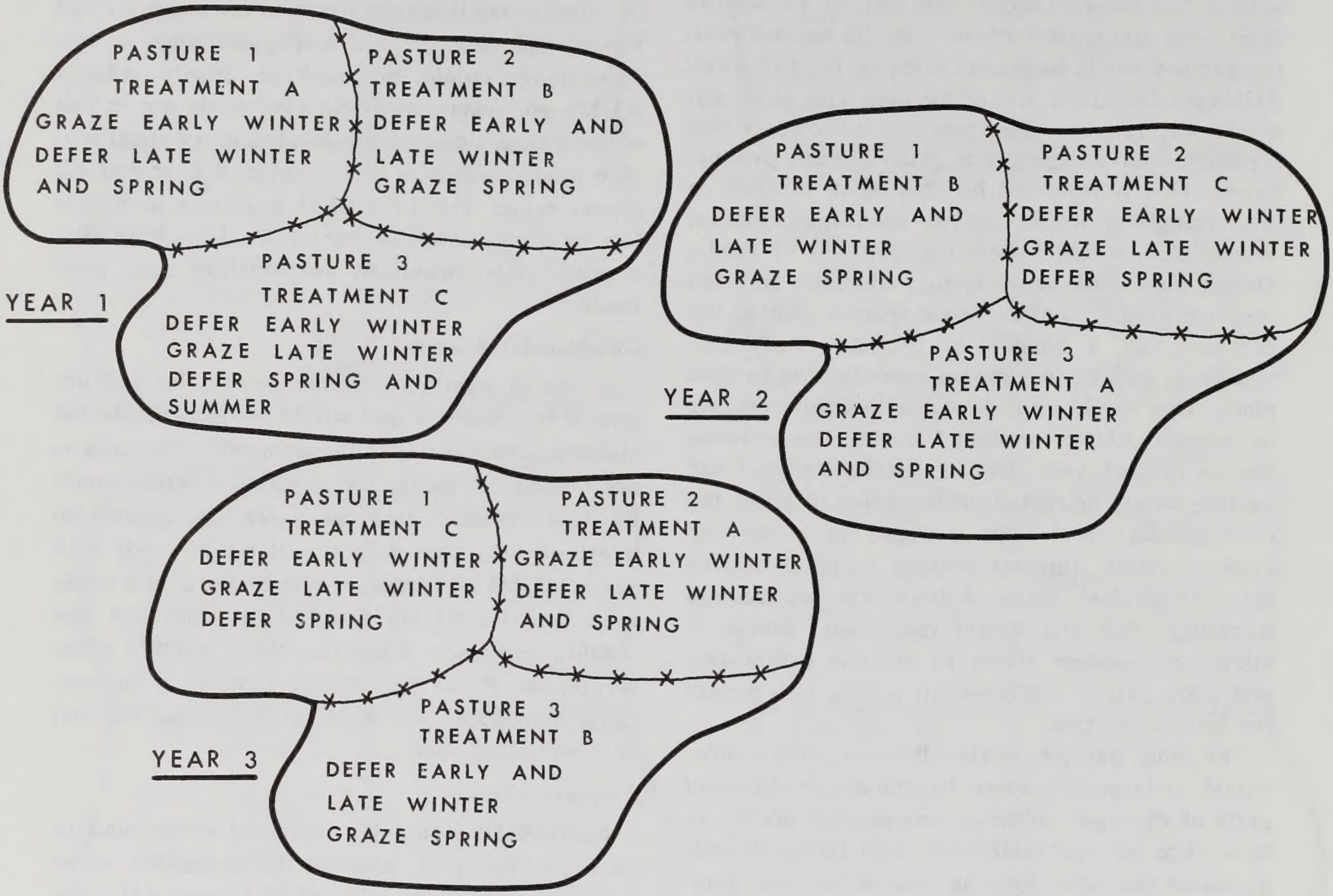
Each AMP would be evaluated at the end of each grazing cycle. Basic to the evaluation, to be made in compliance with BLM Manual 4412, are studies pertaining to actual grazing use, vegetative use, vegetative condition and trend, and precipitation. Data on wildlife would be collected where relevant to the resource involved. Other resource studies would be conducted as needed.

The AMP would be changed where specific objectives failed to be met. The grazing system, livestock numbers or season of use all would be subject to change when deemed advisable. An Environmental Assessment Record (EAR) would be prepared before implementation of revised AMPs.

The areas where all AUMs were reserved for wildlife would be evaluated to see if the objectives (providing wildlife forage, improving range condition, decreasing erosion) are being met. The unallotted area would be used as a study area to see how production, cover, etc., compare with the areas under intensive grazing management.

FIGURE 1-2: EXAMPLE OF A SEASONAL DEFERRED ROTATION GRAZING SYSTEM●

●LIVESTOCK ARE OFF THE ALLOTMENT FROM 6/15 TO 10/31, ALLOWING MAXIMUM GROWTH AND REPRODUCTIVE RESPONSE BY WARM SEASON SPECIES.



Treatment A - Graze in early winter to plant seeds produced during growing season. Defer during late winter and spring to allow maximum recovery, growth, and reproductive response in cool season species.

Treatment B - Defer during early and late winter to eliminate livestock grazing on browse during the critical browse use periods and to allow cool season species to initiate growth. Graze during spring to stimulate vegetative reproduction in cool season species.

Treatment C - Defer grazing during early winter to reduce livestock grazing on browse during critical browse use periods. Graze during late winter to take advantage of early growth of annual plants and to stimulate vegetative reproduction in cool season plants. Defer during spring to allow vigor recovery, growth, and reproductive response in cool season species.

This display shows one example of a deferred rotation grazing system. Other allotments having deferred rotation systems will vary due to pasture size and objectives outlined.

Development of Range Improvements

A series of range improvements would be necessary for intensive grazing management. Construction of eight types of water development improvements, fencing, cattleguards, stock trails and vegetative manipulation would be required for implementing the grazing systems of the proposed AMPs. All range improvements would be built according to BLM Manual requirements. Existing and proposed improvements are shown in Visual C.

Design Features and Constraints

Staking and Marking

Each proposed project would be staked, flagged or otherwise marked to guide work crews. This would set boundaries to prevent unnecessary disturbance of the surrounding area and to provide measurements, lines, locations and grades for construction or treatment areas. Table I-6 is a summation of project construction data and Table I-7 shows proposed range improvements by AMP.

Cultural Resources Clearance

Areas of proposed range improvements would be surveyed prior to construction to determine the presence or absence of cultural resources. If cultural resources are found, the project would be changed, if possible, to avoid damaging the cultural site. If construction cannot be changed, it would be abandoned or the impact expected from construction would be mitigated through salvage and scientific study. If cultural material is discovered during construction or treatment, work would be modified or stopped pending further authorization by the BLM District Manager.

Environmental Protection

Environmental protection of the resource values of each range improvement site and surrounding area is considered of prime importance. A site specific Environmental Assessment Record (EAR) will be completed prior to any work on the project.

Debris Disposal

Trees and brush debris removed during clearing would be scattered, burned, or buried in a specific disposal area. Any unnatural appearing debris would be buried.

Topsoiling and Seeding

Topsoil and vegetation removed during construction would be stockpiled and later used to rehabilitate surface areas disturbed by the work. All disturbed surfaces requiring reseeding to reestablish vegetation would be reseeded with native or introduced species the first fall after completion of the improvement. This cycle would occur each year until plant life is established.

Color Coordination and Landscape

Colors of constructed items in the various range improvements would blend in with the surrounding background, unless high visibility is a key feature of the design, such as in the case of cattleguards and gates. The placing of rocks, dead wood, green trees and brush would be considered in the design of range improvements where straight lines or a large constructed surface needs to be broken up or obscured.

Work Camps

Any work camp, equipment or material storage areas needed would be maintained in a clean orderly manner, consistent with good camp practice, within well-defined boundaries. Upon completion of the work, all signs of occupancy would be removed or obliterated. The design of each range improvement would include these constraints and would be enforced through standard contracting procedures.

Roads, Access

A system of State, County and BLM roads would be used for access to range improvements for purposes of construction and maintenance. The BLM roads cross private land at many points and would require easements for rights-of-way. See Table I-6 for number of easements, mileage and year needed. Although Table I-6 shows there would be 712 acres of disturbance, short-term through implementation of intensive grazing management, all roads in the area are for other land uses as well as for grazing.

Access to range improvement, construction or maintenance projects would be controlled by boundary staking or flagging to prevent random crossing between points or areas of work. Temporary access road construction would be limited to a single lane not to exceed twelve feet in width with turnouts on hilltops and curves. Construction would be limited to clearing of large brush, trees, and boulders. At the completion of range im-

Table I-6

SUMMATION OF DATA FOR RANGE IMPROVEMENT CONSTRUCTION

		PROBABLE YEAR OF COMPLETION						AVERAGE ACRES DISTURBED			
								PER UNIT		TOTAL	
RANGE IMPROVEMENT	Unit	1	2	3	4	5	TOTAL UNITS	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM
WATER DEVELOPMENT											
Wells	No.	5	6	-	-	-	11	0.50	0.10	5.50	1.10
Springs	No.	3	4	-	-	-	7	0.10	0.05	0.70	0.35
Catchments	No.	-	3	1	-	-	4	1.00	0.50	4.00	2.00
Pit Tanks	No.	-	1	-	-	-	1	3.80	1.80	3.80	1.80
Storage Tank	No./Gal.	1/10,000	6/168,000	5/76,000	-	-	12/254,000	0.08	0.04	0.96	0.48
Water Trough	No.	15	66	58	-	-	139	0.10	0.08	13.90	11.12
Wildlife Water	No.	5	37	31	-	-	73	0.10	0.01	7.30	0.73
Pipeline	Mi.	19.1	77.0	70.6	-	-	166.7	1.50	0.10	250.05	16.67
Easements	No./Mi.	17/16.1	14/17.0	-	-	-	31/33.1	—	—	—	—
FENCE											
Proposed	Mi.	21.5	30.4	14.0	-	-	65.9	1.00	0.20	65.90	13.18
Cattleguard	No.	17	31	7	-	-	55	0.06	0.06	3.30	3.30
STOCK TRAIL											
Proposed	Mi.	-	0.5	-	-	-	0.5	2.70	1.50	1.35	0.75
								TOTAL		356.76	51.48
ROAD											
Piedra Lumbre											
Reconstruction	Mi.	-	-	7.0	10.0	5.4	22.4	4.50	1.50	100.80	33.60
Easements	No./Mi.	4/2.0	4/2.0	-	-	-	8/4.0	—	—	—	—
Maintenance	Mi.	a/ b/					381.9	1.60	—	611.04	—
Easements	No./Mi.	35/24.0	40/24.9	43/26.0	18/10.3	-	136/85.2	—	—	—	—
								TOTAL		711.84	33.60
VEGETATIVE MANIPULATION											
Sagebrush Burning	Ac.	1,725	320	-	-	-	2,045	—	—	2,045.00	2,045.00c/
Sagebrush Cutting and Seeding	Ac.	480	-	-	-	-	480	—	—	480.00	480.00c/
								TOTAL		2,525.00	2,525.00

a/ Main arteries - 185.8 Miles - 1/2 to be maintained each year.
b/ Access roads and trails - 196.1 Miles - 1/10 to be maintained each year.
c/ Vegetative manipulation changes vegetative type from predominantly big sagebrush to predominantly shortgrass.

Source: AMP Files for the Proposed Action

Table I-7

PROPOSED RANGE IMPROVEMENTS BY AMP

To Be Implemented Within A Four Year Period
(FY78 through FY81)

MAP NO.	ALLOTMENT NAME	RANGE IMPROVEMENT TO BE CONSTRUCTED	UNITS	YEAR SURVEY AND DESIGN	YEAR OF CONSTRUCTION	COST	TOTAL
TO BE IMPLEMENTED FY78							
21	BAMA	Fence	1.1 mi.	FY77	1st	$ 3,410.00	$ 3,410.00
32	CERRO COLORADOS	No Proposed Improvements					
1	CONTINENTAL DIVIDE	No Proposed Improvements					
5	DRY SPRINGS	No Proposed Improvements					
9	HORN ARROYO	Fence	0.5 mi.	FY77	1st	$ 1,550.00	$ 1,550.00
13	MOLINO	No Proposed Improvements					
8	OJO DE LOS PINOS	No Proposed Improvements					
25	ROCK RIDGE	No Proposed Improvements					
22	SAN MIGUEL	No Proposed Improvements					
6	TRES HERMANOS	No Proposed Improvements					
TO BE IMPLEMENTED FY79							
39	CACHULIE	Cattleguard	1 ea.	FY77	1st	$ 2,457.00	
		Pipeline	6.5 mi.	FY77	1st	30,277.00	
		Trough	6 ea.	FY77	1st	8,046.00	
		Wildlife Waters	3 ea.	FY77	1st	1,485.00	$ 42,265.00
7	CHIUILLA COMMUNITY	Pipeline	5.8 mi.	FY77	1st	$ 27,016.00	
		Trough	3 ea.	FY77	1st	4,023.00	
		Wildlife Waters	1 ea.	FY77	1st	495.00	
		Storage Tank	1 ea. 10,000 gal.	FY77	1st	9,820.00	
		(Burning) Vegetative Manipulation	260 ac.	FY77	1st	1,388.00	$ 42,742.00
16	FORK ROCK MESA	Fence	1.0 mi.	FY77	1st	$ 3,100.00	$ 3,100.00
18	FORTY-FOUR	Fence	1.0 mi.	FY77	1st	$ 3,100.00	$ 3,100.00
26	LOS PINOS ARROYO	Fence	2.3 mi.	FY77	1st	$ 7,130.00	$ 7,130.00
3	PELON	Cattleguard	7 ea.	FY77	1st	$ 17,199.00	$ 17,199.00
11	PENISTAJA	Cattleguard	2 ea.	FY77	1st	$ 4,914.00	
		Pipeline	4.3 mi.	FY77	1st	20,029.00	
		Trough	2 ea.	FY77	1st	2,682.00	
		Wildlife Waters	1 ea.	FY77	1st	495.00	$ 28,120.00
28	PIEDRA LUMBRE	Cattleguard	2 ea.	FY77	1st	$ 4,914.00	$ 4,914.00
38	SAN LUIS COMMUNITY	Pipeline	1.0 mi.	FY77	1st	$ 4,658.00	
		Trough	1 ea.	FY77	1st	1,341.00	$ 5,999.00
2	SHROYER	Pipeline	0.9 mi.	FY77	1st	$ 4,119.00	
		Trough	1 ea.	FY77	1st	1,341.00	$ 5,460.00
4	STARR	Cattleguard	1 ea.	FY77	1st	$ 2,457.00	$ 2,457.00
15	VALLE SAN ISIDRO	Pipeline	0.6 mi.	FY77	1st	$ 2,795.00	
		Trough	1 ea.	FY77	1st	1,341.00	$ 4,136.00
TO BE IMPLEMENTED FY80							
45	ARROYO ALAMITO	Fence	4.0 mi.	1st	2nd	$ 12,400.00	
		Pipeline	5.0 mi.	1st	2nd	23,290.00	
		Troughs	3 ea.	1st	2nd	4,023.00	
		Wildlife Waters	3 ea.	1st	2nd	1,485.00	$ 41,198.00
54	ARROYO PIEDRA PARADA	Fence	1.4 mi.	1st	2nd	$ 4,340.00	
		Pipeline	2.3 mi.	1st	2nd	10,713.00	
		Troughs	2 ea.	1st	2nd	2,682.00	
		Wildlife Water	1 ea.	1st	2nd	495.00	$ 18,230.00
10	BRANDY	Fence	3.0 mi.	FY77	1st	$ 9,300.00	
		Cattleguard	3 ea.	FY77	1st	7,371.00	
		Pipeline	16.4 mi.	1st	2nd	76,391.00	
		Trough	11 ea.	1st	2nd	14,751.00	
		Wildlife Waters	9 ea.	1st	2nd	4,455.00	
		Well	2 ea.	FY77	1st	52,852.00	
		Storage	3 ea. 10,000 gal.	1st	2nd	29,460.00	
		Storage	2 ea. 12,000 gal.	1st	2nd	21,894.00	
		Storage	5 ea. 12,000 gal.	1st	2nd	54,735.00	$271,209.00
31	CANADA CANDELARIA	Fence	2.0 mi.	FY77	1st	$ 6,200.00	
		Pipeline	2.5 mi.	1st	2nd	11,645.00	
		Trough	2 ea.	1st	2nd	2,682.00	
		(Brush Cutting) Vegetative Manipulation	400 ac.	FY77	1st	3,560.00	$ 24,087.00
33	CEBO COMMUNITY	Fence	2.2 mi.	FY77	1st	$ 6,820.00	
		Pipeline	1.1 mi.	1st	2nd	5,124.00	
		Wildlife Waters	1 ea.	1st	2nd	495.00	
		(Burning) Vegetative Manipulation	1,465 ac.	1st	1st	7,823.00	$ 20,262.00
41	CERRO CUATE	Wildlife Waters	1 ea.	1st	2nd	$ 495.00	
		Pipeline	1.4 mi.	1st	2nd	6,521.00	$ 7,016.00
43	CHICO CROSSING	Pipeline	2.3 mi.	1st	2nd	$ 10,713.00	
		Trough	6 ea.	1st	2nd	8,046.00	
		Wildlife Waters	1 ea.	1st	2nd	495.00	
		Spring Development	3 ea.	1st	2nd	17,079.00	$ 36,333.00
29	COAL CREEK	Cattleguard	4 ea.	1st	2nd	$ 9,828.00	
		Pipeline	6.5 mi.	1st	2nd	30,277.00	
		Troughs	3 ea.	1st	2nd	4,023.00	
		Wildlife Waters	4 ea.	1st	2nd	1,980.00	
		Catchment	1 ea.	1st	2nd	24,715.00	
		(Burning) Vegetative Manipulation	160 ac.	1st	2nd	854.00	$ 71,677.00

Table I-7 (continued)

Page 2 of 3 Pages

MAP NO.	ALLOTMENT NAME	RANGE IMPROVEMENT TO BE CONSTRUCTED	UNITS	YEAR SURVEY AND DESIGN	YEAR OF CONSTRUCTION	COST	TOTAL
27	DRY WELL	Fence	3.8 mi.	FY77	1st	$ 11,780.00	
		Cattleguard	1 ea.	1st	2nd	2,457.00	
		Pipeline	5.3 mi.	1st	2nd	24,687.00	
		Spring Development	1 ea.	1st	2nd	5,693.00	
		Trough	5 ea.	1st	2nd	6,705.00	
		Wildlife Waters	2 ea.	1st	2nd	990.00	$ 52,312.00
23	EAGLE MESA	Fence	2.6 mi.	FY77	1st	$ 8,060.00	
		Cattleguard	1 ea.	FY77	1st	2,457.00	
		Pipeline	0.8 mi.	1st	2nd	3,726.00	
		Trough	1 ea.	1st	2nd	1,341.00	
		Wildlife Waters	1 ea.	1st	2nd	495.00	
		Well	1 ea.	1st	1st	26,426.00	
		Storage	1 ea. 36,000 gal.	1st	2nd	32,841.00	
		Spring Development	1 ea.	FY77	1st	5,693.00	
		Trough	1 ea.	FY77	1st	1,341.00	$ 82,380.00
30	ELK SPRING	Pipeline	0.8 mi.	1st	2nd	$ 3,726.00	
		Trough	1 ea.	1st	2nd	1,341.00	
		Wildlife Waters	1 ea.	1st	2nd	495.00	
		Catchment	1 ea.	1st	2nd	24,715.00	
		(Burning) Vegetative Manipulation	160 ac.	1st	2nd	854.00	$ 31,131.00
61	GYPSUM HILL	Fence	2.0 mi.	1st	2nd	$ 6,200.00	
		Cattleguard	1 ea.	1st	2nd	2,457.00	
		Pipeline	2.3 mi.	1st	2nd	10,713.00	
		Trough	1 ea.	1st	2nd	1,341.00	$ 20,711.00
12	LAGUNITAS	Fence	2.0 mi.	FY77	1st	$ 6,200.00	
		Cattleguard	1 ea.	1st	2nd	2,457.00	$ 8,657.00
40	LOST VALLEY	Cattleguard	1 ea.	1st	2nd	$ 2,457.00	
		Pipeline	9.5 mi.	1st	2nd	44,251.00	
		Trough	7 ea.	1st	2nd	9,387.00	
		Wildlife Waters	5 ea.	1st	2nd	2,475.00	$ 58,570.00
17	MESA PORTALES	Trough	1 ea.	1st	2nd	$ 1,341.00	
		Pipeline	0.5 mi.	1st	2nd	2,329.00	$ 3,670.00
58	MIGHTY MITE	Pipeline	0.5 mi.	2nd	3rd	$ 2,329.00	
		Trough	1 ea.	1st	2nd	1,341.00	
		Stock Trail	0.3 mi.	1st	2nd	1,893.00	$ 5,563.00
14	NACIMIENTO	Fence	1.2 mi.	1st	2nd	$ 3,720.00	
		Cattleguard	1 ea.	1st	2nd	2,457.00	
		Pipeline	1.1 mi.	1st	2nd	5,124.00	
		Trough	2 ea.	1st	2nd	2,682.00	$ 13,983.00
37	NORTH SAN LUIS MESA	Pipeline	3.8 mi.	1st	2nd	$ 17,700.00	
		Trough	3 ea.	1st	2nd	4,023.00	
		Wildlife Waters	2 ea.	1st	2nd	990.00	
		Pit Tank	1. ea (4 ac. ft.)	1st	2nd	6,303.00	
		Stock Trail	.2 mi.	1st	2nd	1,262.00	$ 30,278.00
59	RIO SALADO COMMUNITY	Trough	3 ea.	1st	2nd	$ 4,023.00	
		Well	1 ea.	FY77	1st	26,426.00	
		Spring Development	2 ea.	FY77	1st	11,386.00	
		Storage	1 ea. 10,000 gal.	1st	2nd	9,820.00	$ 51,655.00
24	RIDGE TOP	Fence	0.5 mi.	1st	2nd	$ 1,550.00	
		Pipeline	2.5 mi.	1st	2nd	11,645.00	
		Trough	2 ea.	1st	2nd	2,682.00	
		Wildlife Waters	1 ea.	1st	2nd	495.00	$ 16,372.00
20	SAN PABLO	Pipeline	2.0 mi.	1st	2nd	$ 9,316.00	
		Trough	3 ea.	1st	2nd	4,023.00	
		Wildlife Waters	2 ea.	1st	2nd	990.00	
		Catchment	1 ea.	1st	2nd	24,715.00	$ 39,044.00
46	SAN YSIDRO PASTURE	Fence	3.1 mi.	1st	2nd	$ 9,610.00	
		Cattleguard	2 ea.	1st	2nd	4,914.00	
		Pipeline	6.6 mi.	1st	2nd	30,743.00	
		Trough	4 ea.	1st	2nd	5,364.00	
		Wildlife Waters	3 ea.	1st	2nd	1,485.00	$ 52,116.00
19	SENORITO	Pipeline	0.9 mi.	1st	2nd	$ 4,192.00	
		Trough	1 ea.	1st	2nd	1,341.00	$ 5,533.00
34	TWIN BUTTE	Fence	3.2 mi.	1st	2nd	$ 9,920.00	
		Cattleguard	8 ea.	1st	2nd	19,656.00	
		Pipeline	3.4 mi.	1st	2nd	15,837.00	
		Trough	4 ea.	1st	2nd	5,364.00	
		(Brush Cutting) Vegetative Manipulation	80 ac.	FY77	1st	712.00	$ 51,489.00
TO BE IMPLEMENTED FY81							
36	ARROYO EMPEDRADO	Fence	2.5 mi.	1st	2nd	$ 7,750.00	
		Pipeline	0.9 mi.	2nd	3rd	4,192.00	
		Trough	1 ea.	2nd	3rd	1,341.00	
		Wildlife Waters	1 ea.	2nd	3rd	495.00	
		Well	1 ea.	FY77	2nd	26,426.00	
		Storage	1 ea 8,000 gal.	2nd	3rd	8,826.00	$ 49,030.00

Table I-7 (continued)

Page 3 of 3 Pages

MAP NO.	ALLOTMENT NAME	RANGE IMPROVEMENT TO BE CONSTRUCTED	UNITS	YEAR SURVEY AND DESIGN	YEAR OF CONSTRUCTION	COST	TOTAL
42	AZABACHE	Fence	3.2 mi.	1st	2nd	$ 9,920.00	
		Cattleguard	6 ea.	1st	2nd	14,742.00	
		Pipeline	15.6 mi.	2nd	3rd	73,665.00	
		Trough	12 ea.	2nd	3rd	16,092.00	
		Wildlife Waters	7 ea.	2nd	3rd	3,465.00	
		Well	2 ea.	FY77	2nd	52,852.00	
		Storage	1 ea. 36,000 gal.	2nd	3rd	32,841.00	$203,577.00
52	BANCO DE LA CASA	Cattleguard	2 ea.	1st	2nd	$ 4,914.00	
		Pipeline	2.5 mi.	2nd	3rd	11,645.00	
		Trough	4 ea.	2nd	3rd	5,364.00	
		Wildlife Waters	1 ea.	2nd	3rd	495.00	
		Well	1 ea.	FY77	2nd	26,426.00	
		Storage	1 ea. 6,000 gal.	2nd	3rd	7,939.00	$ 56,783.00
44	CABEZON PEAK	Fence	5.3 mi.	1st	2nd	$ 16,430.00	
		Cattleguard	2 ea.	1st	2nd	4,914.00	
		Pipeline	6.8 mi.	2nd	3rd	31,674.00	
		Trough	4 ea.	2nd	3rd	5,364.00	
		Wildlife Waters	5 ea.	2nd	3rd	2,475.00	$ 60,857.00
53	CANON DEL CAMINO	Fence	2.5 mi.	2nd	3rd	$ 7,750.00	
		Pipeline	4.6 mi.	2nd	3rd	21,427.00	
		Trough	4 ea.	2nd	3rd	5,364.00	
		Wildlife Waters	2 ea.	2nd	3rd	990.00	$ 35,531.00
55	CORRALES TIERRA	Pipeline	0.3 mi.	2nd	3rd	$ 1,387.00	
		Trough	1 ea.	2nd	3rd	1,341.00	$ 2,728.00
57	CUCHO ARROYO	Fence	3.5 mi.	2nd	3rd	$ 10,850.00	
		Pipeline	7.0 mi.	2nd	3rd	32,606.00	
		Trough	5 ea.	2nd	3rd	6,705.00	
		Wildlife Waters	3 ea.	2nd	3rd	1,485.00	$ 51,646.00
49	EL BANQUITO	Pipeline	0.8 mi.	2nd	3rd	$ 3,726.00	
		Troughs	2 ea.	2nd	3rd	2,682.00	
		Wildlife Waters	1 ea.	2nd	3rd	495.00	
		Well	1 ea.	FY77	2nd	26,426.00	
		Storage	1 ea. 20,000 gal.	2nd	3rd	19,640.00	$ 52,969.00
47	GUADALUPE COMMUNITY	Fence	3.5 mi.	1st	2nd	$ 10,850.00	
		Cattleguard	2 ea.	1st	2nd	4,914.00	
		Pipeline	8.6 mi.	2nd	3rd	40,059.00	
		Trough	5 ea.	2nd	3rd	6,705.00	
		Wildlife Waters	3 ea.	2nd	3rd	1,485.00	$ 64,013.00
50	IGNACIO CHAVEZ GRANT	Fence	1.2 mi.	2nd	3rd	$ 3,720.00	
		Cattleguard	2 ea.	2nd	3rd	4,914.00	
		Pipeline	7.0 mi.	2nd	3rd	32,606.00	
		Trough	3 ea.	2nd	3rd	4,023.00	
		Wildlife Waters	4 ea.	2nd	3rd	1,980.00	
		Catchment	1 ea.	2nd	3rd	24,715.00	$ 71,958.00
48	MESA CORTADA	Fence	5.3 mi.	2nd	3rd	$ 16,430.00	
		Cattleguard	3 ea.	2nd	3rd	7,371.00	
		Trough	1 ea.	2nd	3rd	1,341.00	
		Well	1 ea.	FY77	2nd	26,426.00	
		Storage	1 ea. 6,000 gal.	2nd	3rd	7,939.00	$ 59,507.00
56	PIPELINE	Cattleguard	1 ea.	2nd	3rd	$ 2,457.00	
		Pipeline	12.5 mi.	2nd	3rd	58,225.00	
		Trough	9 ea.	2nd	3rd	12,069.00	
		Wildlife Water	4 ea.	2nd	3rd	1,980.00	$ 74,731.00
60	ROCK HOUSE	Fence	1.5 mi.	2nd	3rd	$ 4,650.00	
		Cattleguard	1 ea.	2nd	3rd	2,457.00	
		Pipeline	1.2 mi.	2nd	3rd	5,590.00	
		Trough	2 ea.	2nd	3rd	2,682.00	$ 15,379.00
51	SALADO-TAPIA	Pipeline	1.8 mi.	2nd	3rd	$ 8,384.00	
		Trough	3 ea.	2nd	3rd	4,023.00	$ 12,407.00
35	TORREON WASH	Fence	0.5 mi.	1st	2nd	$ 1,550.00	
		Pipeline	0.5 mi.	2nd	3rd	2,329.00	
		Trough	2 ea.	2nd	3rd	2,682.00	
		Well	1 ea.	FY77	1st	26,426.00	
		Storage	1 ea. 8,000 gal.	1st	2nd	8,826.00	$ 41,813.00

Source: AMP Files for the Proposed Action.

provement work, temporary access roads would be scarified, water bars would be installed and the area reseeded.

Existing permanent roads and trails would be used for access to most range improvements. The 22.4 mile long Piedra Lumbre Road would be improved by grading and draining the existing road or trail and installing cattleguards (see Table I-6). Total cost for improvement of the Piedra Lumbre Road would be $112,000.

Wells

Wells would supply a source of permanent water. Figure I-3 shows a typical well, with pumping equipment. Well site preparation and clearing would vary with terrain, vegetation, and drilling equipment. The disturbed area around the drilling point would be approximately 75 to 150 feet in diameter, or approximately 6,000 to 24,000 square feet. The actual drill point would be located so as to prevent unnecessary site preparation and clearing wherever possible. Tractor construction methods would be unnecessary except in the roughest terrain. A pit would be excavated for mud or water storage during the drilling. Drill cuttings would be placed in the pit, which would be covered over upon completion. The filled-in pit would have a compacted density equal to that of the surrounding earth. A typical pit would cover 200 square feet and would be located in the larger disturbed area around the well.

Wells would be drilled without using mud pumped under pressure, thus averting the possible plugging of waterbearing formations. A hole nine inches in diameter and 600 feet deep would produce at least 9.8 cubic yards of drilled material. A six-inch casing or pipe would be installed. Perforations in the casing would allow the water to enter, and it would then flow out the top, in the case of artesian or pressure wells, or stand in the casing ready for pumping in other types of wells. A windmill would be installed on non-artesian wells.

Springs

Spring developments generally fall into two categories, point source and seep area. Both types require excavation into the soil or sandstone where the seep or water flow appears at the surface. Figure I-4 shows a typical spring development from a seep.

In some cases, a drilled hole into or below the seep allows the water to flow out of a pipe installed in the hole. The drilled hole, approximately two inches in diameter, would be located so that water trapped behind a fault or incline in the rock would drain only through the pipe.

In most cases, excavation by hand or backhoe would be required. A track-type tractor might be required to move large rocks or make access for installing a water collection box and pipeline. A seep area would require the excavation of trenches 36 inches deep by 36 inches wide for the length of the seep area.

Clearing for spring development would be limited to the area where a spring box and collection pipe would be installed. Any excavation, open cuts or fills would be shaped and blended with the surrounding area. Any grass sod removed would be replaced in the same location after hardware is installed. Fencing would be installed where needed to protect a spring from damage or contamination by livestock or wildlife.

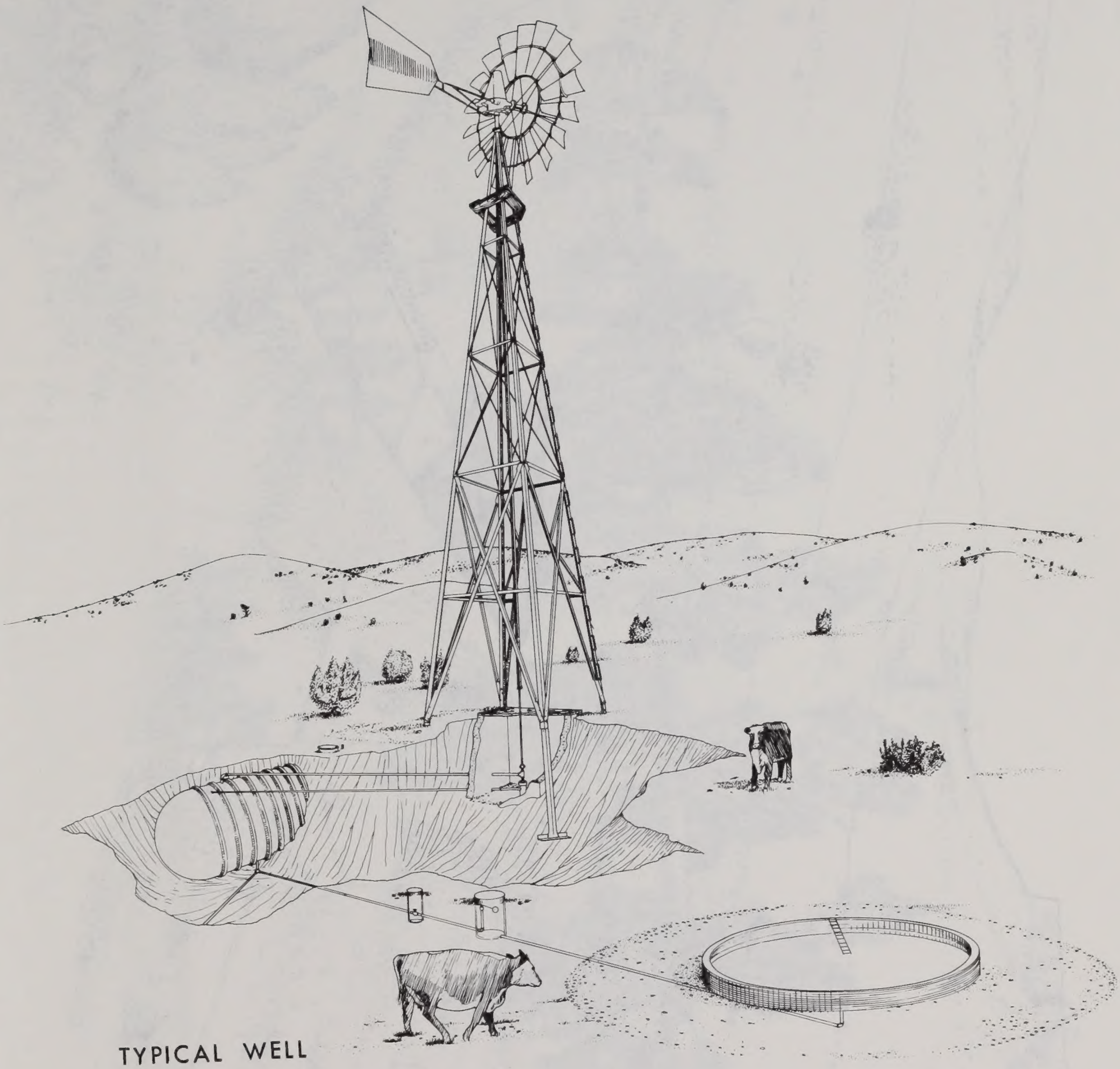
Catchments

Catchments, another type of surface tank used to supply range water, are designed in various ways depending on the number of livestock involved, the expected wildlife and the average yearly rainfall. In site choice, such things as slope and soil type are considered. Where a pipeline is needed the potentials for gravity flow to the drinking troughs is also considered. Figure I-5 shows a typical catchment.

In one year, a catchment area 100 feet square, containing 10,000 square feet, would supply 50,000 gallons of water from eight inches of precipitation. The water would be stored in a pit excavated with a track-type tractor. Lined with butyl rubber, a pit measuring 54 feet by 39 feet and 6 feet deep would hold approximately 50,000 gallons of water. This would be adequate for 4,166 cow days at the rate of 12 gallons per cow per day. Such a pit would be built with 2:1 side slopes (two feet horizontal to one foot vertical).

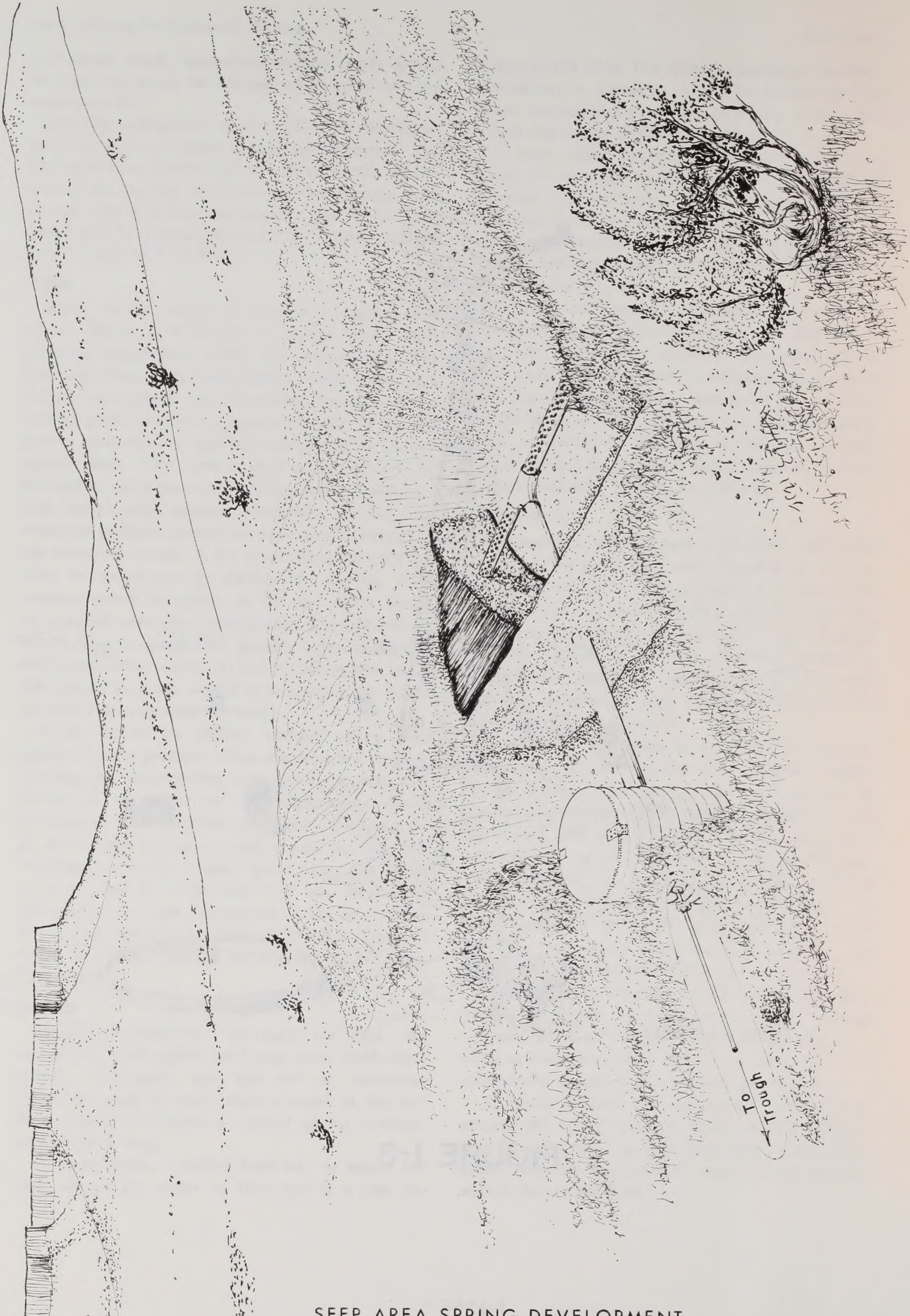
Catchment site clearing would involve stripping vegetation under the catchment surface, storage pit, and drinking troughs. This material would be used to build necessary dikes. The area would be graded and shaped into a natural appearance.

A fence around the catchment surface and storage pit would exclude livestock and wildlife. The fence would be eight feet high in big game areas. Natural revegetation would occur quickly within the fenced area.



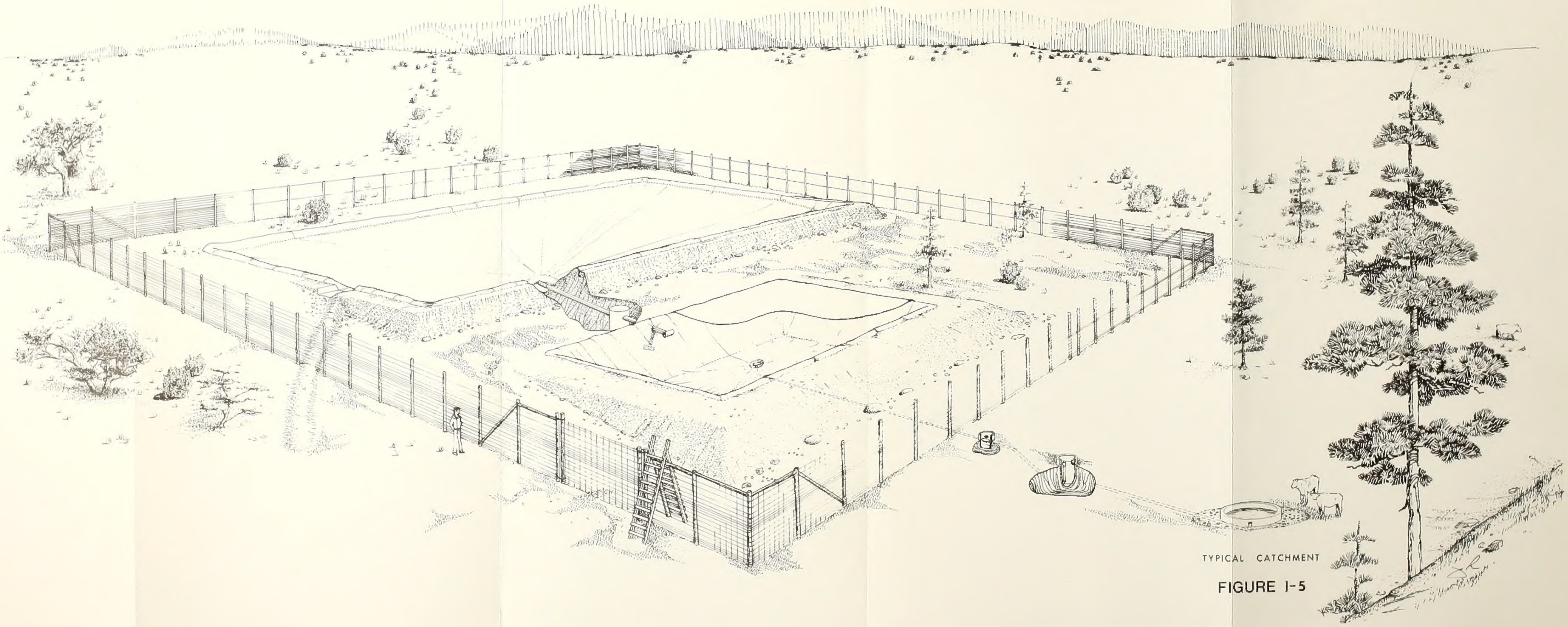
TYPICAL WELL

FIGURE I-3



SEEP AREA SPRING DEVELOPMENT

FIGURE I-4



TYPICAL CATCHMENT

FIGURE I-5

Pit Tanks

Pit tanks would be built on soil found capable of holding water with little loss from soaking into the ground. The water is impounded to a depth of twelve feet to reduce evaporation losses.

Clearing for pit tank would involve working all vegetation at the site into the top six inches of soil, then stripping the combined material from the site. The removed soil would be stockpiled during construction and used to rehabilitate the exposed surface afterward. Seeding would occur the first fall after construction. The spillway would be a natural, flat, wide area with some vegetal cover. Figure I-6 shows a typical pit tank.

The earth excavated from the pit would be placed around it on three sides. A 25 foot berm or flat space would be left between the edge of the pit and the embankment around it. The embankment would be rounded off.

Pipelines

Pipeline right-of-way clearing would be limited to twelve feet except at arroyo crossings. Arroyo crossings would be sloped on 3:1 from the top to the bottom of the arroyo on both sides. The side slopes of this cut would be 1:1. The earth material from the arroyo crossing cut would be disposed of by building channel banks on benches in the arroyo above the stream bed on each side of the cut. Some of the earth would be used to build dikes at the upper end of the cut to prevent water from flowing down the pipeline into the arroyo. See Figure I-7 for a drawing of a typical pipeline arroyo crossing.

At present, pipe with a pressure rating of approximately 160 pounds per square inch (PSI) and lower, and with a diameter of two to two and one-half inches, can be buried by the ripping in process. Pipe with a pressure rating above 160 PSI normally would be buried in an excavated trench. Trenching or ripping for pipe laying would be routed within the twelve foot right-of-way to avoid unnecessary clearing. Signs four inches wide by ten inches high, mounted on short posts along the pipeline, would mark the pipe route.

Troughs, Wildlife Watering Devices, Storage Tanks

See Figure I-7 for a drawing of a typical trough, wildlife watering device and storage tank. The clearing for a drinking trough or storage tank would require special dimensions varying from site to site. Generally the trough or storage tank width or length plus ten feet would suffice.

A trough, locking float chamber, wildlife watering device or storage tank would be installed at predetermined points to meet management needs. A drinking trough would be set into the ground with only the top ten inches above the ground for small animal use. A wildlife escape ladder or ramp would be installed in each trough. A float valve approximately 25 feet from the drinking trough would control the water level. A gravel pad four feet wide and four inches thick would surround each drinking trough.

Another watering device for birds and small wildlife would be installed at ground level. A fiberglass bowl, three feet in diameter and nine inches deep, would provide the drinking basin. The bowl would have a flat slope from the bottom to the lip so that the sides are like a ramp. It would be tilted one-half inch off level to allow a small seep at some locations, permitting limited green grass growth. The water level would be adjusted by a control unit in a protective box nearby. Natural barriers would keep livestock away from the wildlife water basin where possible, with fencing installed as needed.

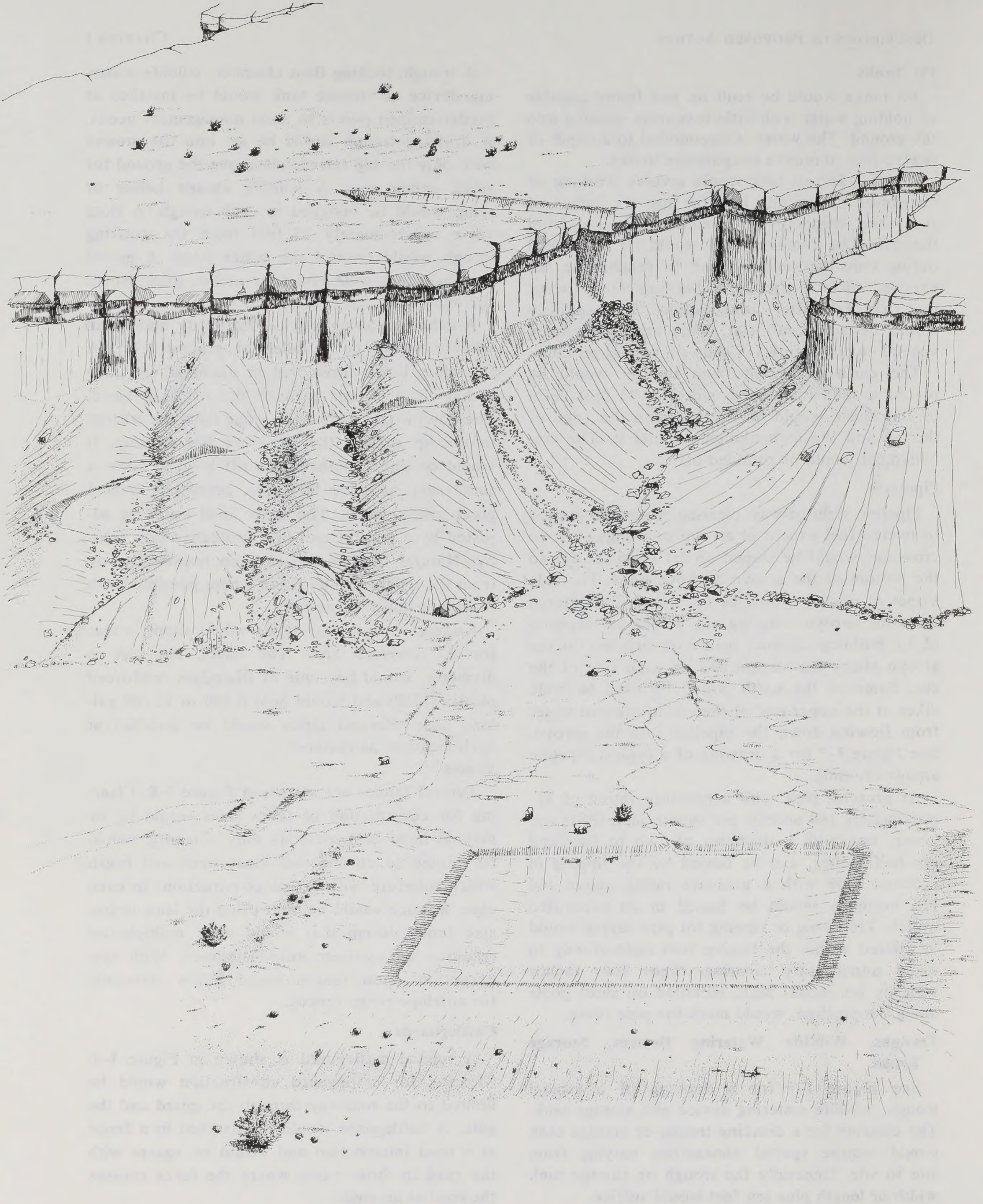
Underground storage tanks would supply water for the serviced area. The tanks, ten feet in diameter, would be made of fiberglass reinforced plastic (FRP) and would hold 6,000 to 12,000 gallons each. Several tanks would be installed at each location, as required.

Fences

Typical fences are shown in Figure I-8. Clearing for construction of fence lines would be by manual hand tool methods only. Clearing would be limited to cutting individual trees and brush which interfere with actual construction. In each case, a fence would be built using the least obtrusive fence design that would meet multiple-use resource management responsibilities. With few exceptions, new fences would follow standards for antelope range fences.

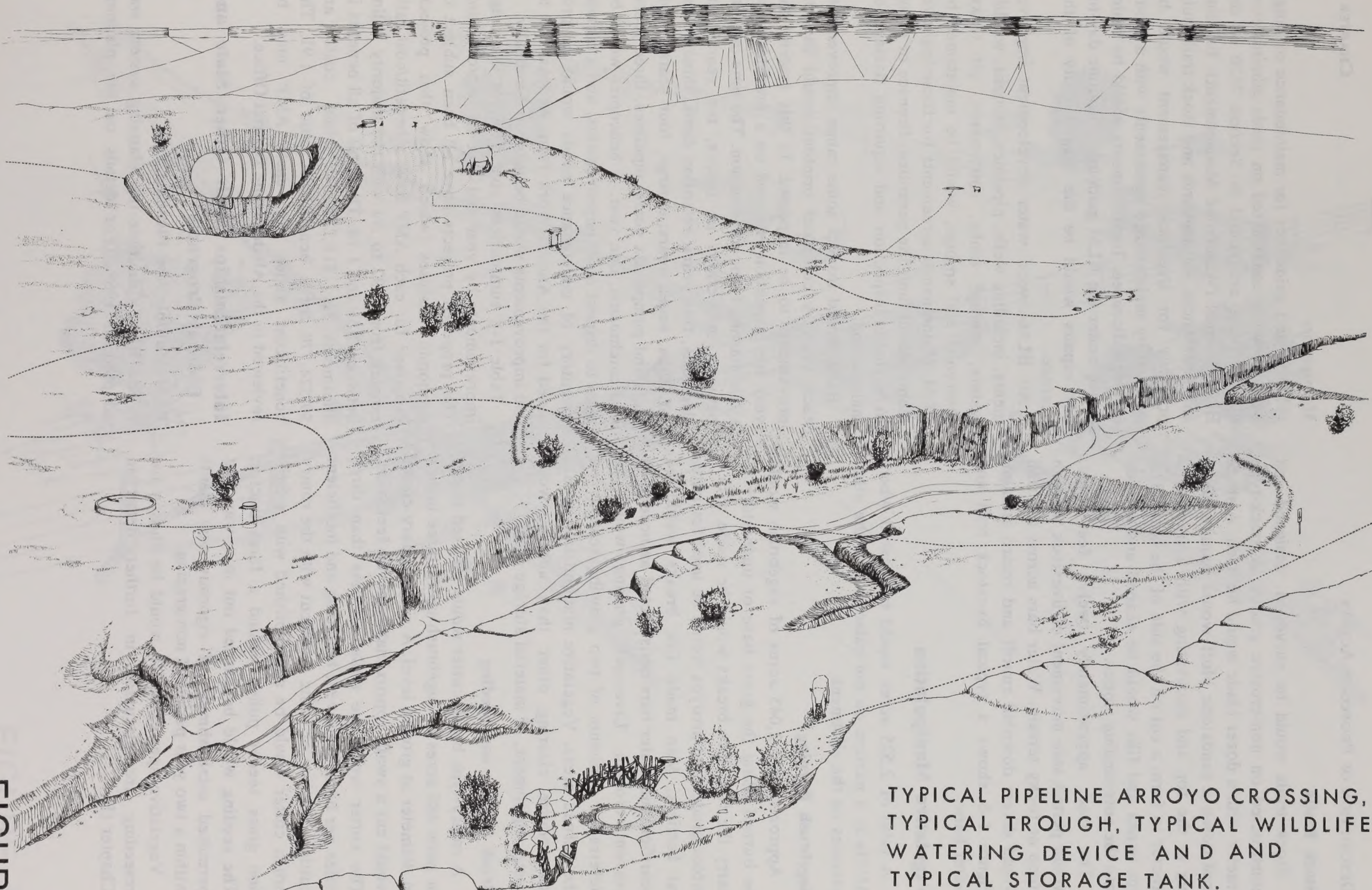
Cattleguards

A typical cattleguard is shown in Figure I-8. Clearing for cattleguard construction would be limited to the roadway through the guard and the gate. A cattleguard would be installed in a fence at a road intersection and would be square with the road in those cases where the fence crosses the road at an angle.



TYPICAL PIT TANK, LIVESTOCK TRAIL AND WATER BARS.

FIGURE I-6



TYPICAL PIPELINE ARROYO CROSSING, TYPICAL TROUGH, TYPICAL WILDLIFE WATERING DEVICE AND AND TYPICAL STORAGE TANK.

FIGURE I-7

Stock Trails

Stock trails would be surveyed, designed and constructed on non-erosive grades. A track-type tractor with a dozer blade would be used. A stock trail down a sandstone bluff would require blasting at the top and excavating with a track-type tractor to form a cut on the side of the bluff. The cut banks and fills would be shaped and warped into the surrounding slopes.

The trail, approximately twelve feet wide, would permit safe movement of livestock through steep or rocky terrain. Water bars across the trail would divert downhill runoff and retard erosion. Figure I-6 shows a typical livestock trail and water bars.

Vegetative Manipulation

A total of 2,525 acres would be treated where AUMs in a pasture do not balance with the other pastures on the allotment.

Sagebrush Burning

Approximately 2,045 acres of sagebrush would be burned using the grass base or understory to carry the fire. Fire breaks would be made with a motor grader and arroyos would be used for natural barriers. Man made fire breaks would be scarified and water bars constructed as needed to prevent erosion. Livestock grazing would be deferred a minimum of two growing seasons on the burned areas. Vegetative manipulation would not require clearing other than access, work camp, equipment, or material storage areas.

Brush Cutting and Seeding

A rotary-type brush cutter would be used to cut or mow 480 acres of sagebrush up to three inches in diameter at ground level. A single rotary cutter would cut a swath approximately seven feet wide. The cutter would be pulled at less than three miles per hour to prevent bouncing and inefficient cutting. Seeding of some areas cut with the rotary brush cutter would be accomplished with a Brillion grass seeder pulled behind a farm tractor. The seeding would be carried out in a way that permitted establishment of vigorous new plants within a two year period of non-grazing.

Vegetative species which would be chosen for reseeding are discussed in further detail in Chapter III.

Maintenance

Policy and guidelines for maintenance of range improvements constructed on lands administered by the BLM are found in Section 7120 of the BLM Manual (Watershed Management). Existing and new fences, cattleguards and stock trails built primarily for livestock management would be covered by maintenance agreements with a group or single licensee. Improvements would be maintained under the BLM guidelines. Routine day-to-day repairs would be the responsibility of the licensee.

All BLM-owned water development improvements, including wells, pipelines, troughs, wildlife waters, storage tanks, catchments, pit tanks, reservoirs and springs, would be maintained by BLM. Maintenance agreements for these improvements would limit the permittee, licensee or group to periodic inspection and reporting damage or malfunction.

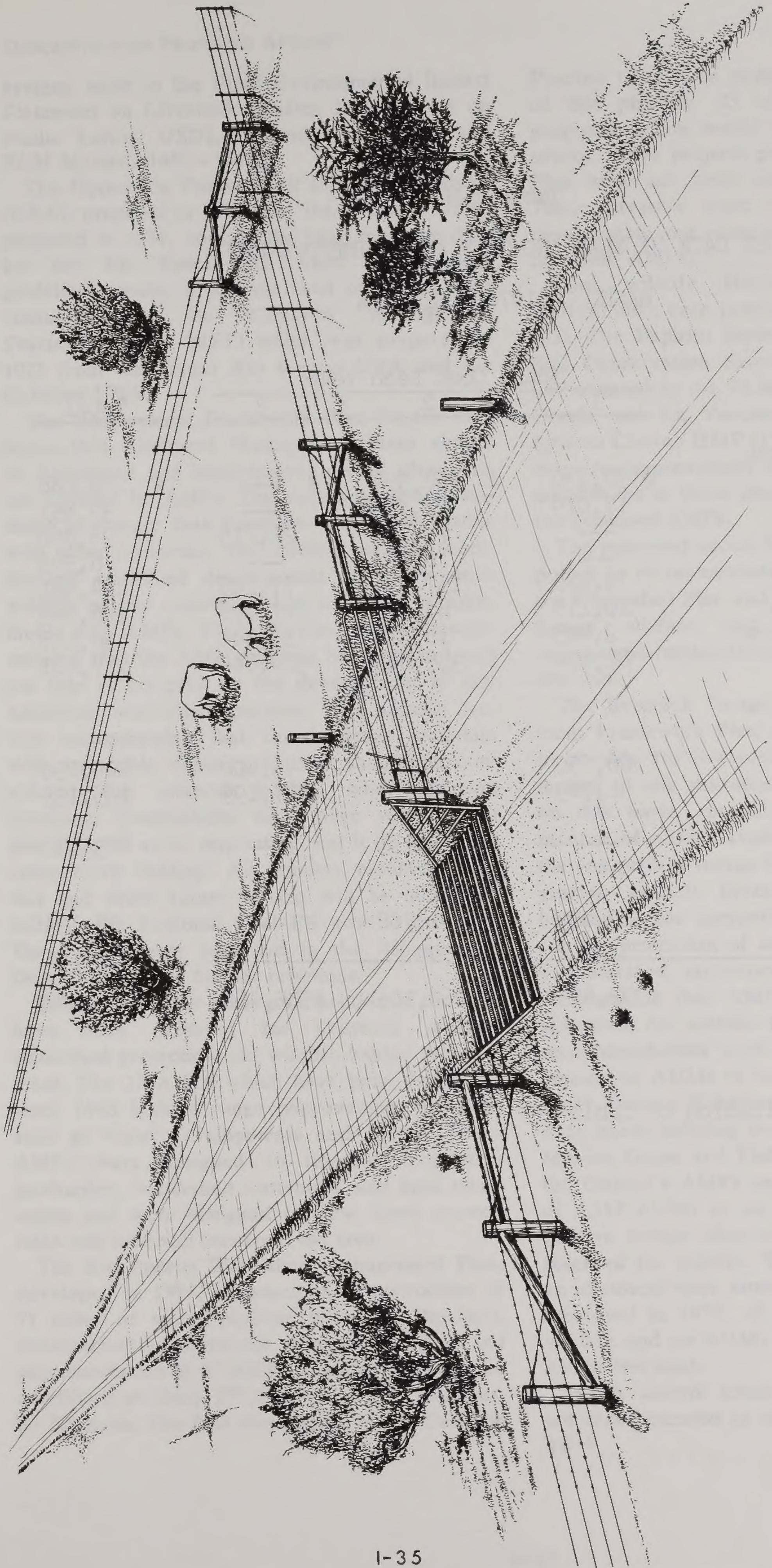
BLM would inspect some range improvements each year. A computer printout would list improvements to be inspected. In this system, the year for inspection is based on a predetermined cycle starting from construction. The time interval between inspections is: fences, ten years; cattleguards, five years; retention dams, three years; pit tanks, seven years; springs, four years; windmills and pumps, six years; pipelines, three years; and catchments, one year. A helicopter would be used to inspect most improvements, and a current inventory of maintenance needs would be provided for the Annual Work Plan. At least 350 to 450 improvements would be inspected annually.

Table I-8 summarizes cost data for the range improvements by year and type of improvement. The proposed projects have all been subject to economic analyses which show that projects proposed for each AMP have a benefit/cost ratio ranging from 5.92 to .94 with the majority falling between 2.33 and 1.14. The total of all benefits in allotments is $18,223,254 while costs are $9,524,770 for a benefit/cost ratio of 1.91. The benefit/cost ratios for each AMP may be reviewed in the Albuquerque District Office.

Interrelationships With Other State and Federal Programs

BLM Multiple Use Planning

The BLM's multiple use planning system was adopted in 1969. (For details on the planning



TYPICAL FENCE; TYPICAL CATTLE GUARD

FIGURE 1-8

Table I-8

COST DATA BY YEAR AND TYPE RANGE IMPROVEMENT

BASED ON 1976 COST DATA

	Total Cost Each Year			
	1	2	3	Total
Water Development				
Wells	$132,130	$ 158,556	$ ---	$ 290,686
Springs	17,079	22,772	---	39,851
Catchments	---	74,145	24,715	98,860
Pit Tanks	---	6,303	---	6,303
Storage Tanks	9,820	157,576	77,185	244,581
Water Troughs	20,115	88,506	77,778	186,399
Wildlife Waters	2,475	18,315	15,345	36,135
Pipeline	88,894	358,663	329,844	777,401
Easements				
Fence				
Proposed	66,650	94,240	43,400	204,290
Cattleguard	41,769	76,167	17,199	135,135
Stock Trail	---	3,155	---	3,155
Vegetative Manipulation	13,483	1,708	---	15,191
TOTAL	$392,415	$1,060,106	$585,466	$2,037,987

Source: Summarization of Table I-7

system, refer to the Final Environmental Impact Statement on Livestock Grazing Management on Public Lands, USDI, December 31, 1974, and BLM Manuals 1601—1608.)

The Upper Rio Puerco Unit Resource Analysis (URA), prepared in 1970, and the Cabezon URA, prepared in 1971, contain the base resource data for the Rio Puerco ES Area. Management guidelines, goals, objectives, and constraints are contained in the Cabezon Management Framework Plan (MFP) which was prepared in 1972 from the Upper Rio Puerco URA and the Cabezon URA.

The Management Framework Plan for the area states that Allotment Management Plans should be developed and implemented on all allotments not covered by AMPs. This recommendation was made to ensure that livestock use is compatible with other resources. The wildlife section recommended continued development of AMPs since wildlife habitat conditions had improved in allotments with AMPs. The watershed section recommended that the AMP program be continued and put into effect prior to the development of any additional watershed practices. The mineral section recommended that certain areas underlain with strippable deposits of coal should be considered for mineral leasing when demand develops. Nominations have been received on about 28,000 acres requesting that it be leased by competitive bidding. All impacts resulting from this and other future leasing will be addressed fully in the Regional Coal ES now in progress. These documents are filed in the Albuquerque District Office for further reference.

Resource activity plans on a portion of the area have been prepared for livestock grazing, watershed protection and wildlife habitat management. The 27 AMPs which have been developed since 1968 include range improvement practices such as water developments and fences. These AMPs were designed to improve vegetative production, watershed structures and land treatments and were designed to slow down erosion rates and total soil loss from the area.

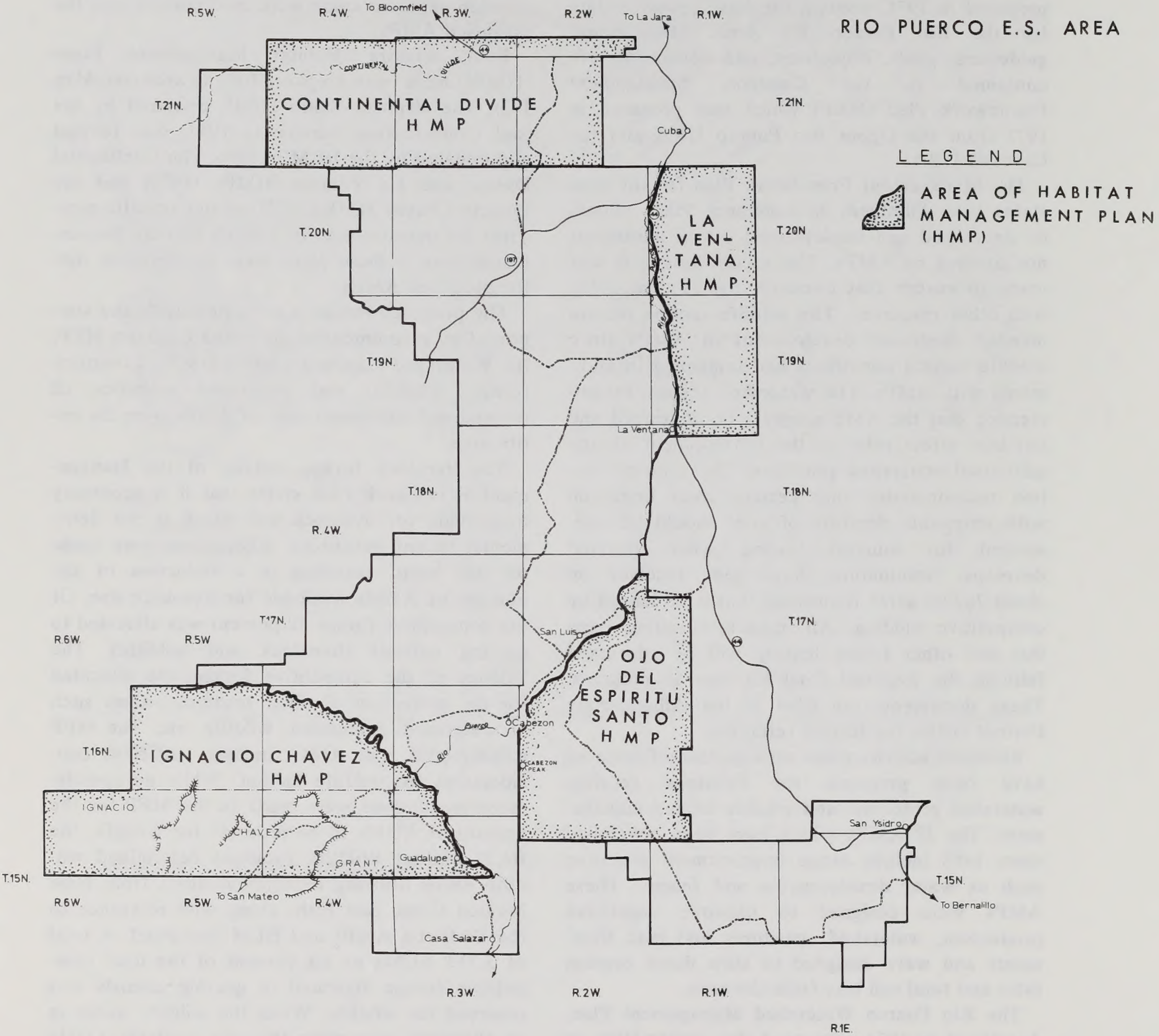
The Rio Puerco Watershed Management Plan, developed in 1974, proposed the construction of 71 miles of water pipeline (Cabezon Pipeline), construction of livestock drinking troughs, and implementation of 47 AMPs to improve watershed conditions on about 277,000 acres in the Rio Puerco ES Area. The first two phases of the Cabezon Pipeline have been completed. Upon completion of this pipeline, 25 of the allotments in the proposed action would be served by this water source. Many projects proposed in the Watershed Plan have not been constructed or completed. These projects were considered during AMP development and some were incorporated into the proposed AMPs.

Four wildlife Habitat Management Plans (HMPs) have been prepared for the area (see Map I-2). The Espirito Santo HMP, prepared by the Soil Conservation Service in 1937, was revised and updated by the BLM in 1976. The Continental Divide and La Ventana HMPs (1970) and the Ignacio Chavez HMP (1972) set out specific measures for improvement of wildlife habitat. Recommendations in these plans were incorporated into the proposed AMPs.

The proposed action is consistent with and supported by recommendations in the Cabezon MFP, the Watershed Plan and wildlife HMPs. Livestock forage, wildlife, and watershed activities all recommend implementation of AMPs over the entire area.

The livestock forage activity of the Management Framework Plan states that it is necessary to provide for livestock use which is not detrimental to any resources. Allocations were made on this basis, resulting in a reduction of the number of AUMs available for livestock use. Of the competitive forage 50 percent was allocated to grazing animals (livestock and wildlife). The balance of the competitive forage was allocated for the protection of other resource values such as watershed, recreation, wildlife, etc. The MFP recommends that AMPs include sufficient consideration for wildlife habitat. While no specific recommendations were made in the MFP for the amount of AUMs to be reserved for wildlife, the BLM District Wildlife Biologist determined wildlife needs utilizing recommendations from New Mexico Game and Fish, along with reference to the District's AMPs and BLM personnel. A total of 3,313 AUMs or six percent of the total competitive forage allocated to grazing animals was reserved for wildlife. When the wildlife needs in an allotment were more than the available AUMs measured in 1975, all AUMs were reserved for wildlife and no AUMs were available for grazing use by livestock.

Brush control treatments in designated areas are recommended to reduce competition between



SOURCE: ALBUQUERQUE DISTRICT OFFICE,
HABITAT MANAGEMENT PLAN FILE

MAP I-2

forage vegetation from competing brushy plants. The MFP recommends that fences be designed to blend with the natural setting, with minimal vegetative disturbance during construction. It also recommends combining small allotments to make larger more manageable units. Developments that would significantly detract from aesthetic values of the natural landscape are restricted in an area around Cabezon Peak and in the Mineral Springs area near San Ysidro. Proposed fences and water developments in the restricted area should be designed and located to avoid compromising aesthetic values.

Other Federal Programs

Forest Service

Thirty-six seasonal operators graze their livestock on BLM allotments in the winter and spring and move them onto National Forest grazing allotment in the Cuba District, Jemez Springs District and Mt. Taylor District in the summer and fall. The Cuba Range District of the Santa Fe National Forest has identified over-grazing problems on allotments in and around the San Pedro Parks Wilderness Area. Forest Service permittees have been notified that grazing management will be intensified and stocking rates adjusted downward by 1985 to balance forage consumed with livestock forage available. Permittees have been given the opportunity to transfer their grazing permits to the Jemez Ranger District or the Pecos Ranger District, where excess forage is available, if they do not wish their permitted numbers of livestock reduced. Since a number of the permittees on the Cuba Ranger District have BLM grazing permits, changes in season of use or numbers of permitted livestock proposed by one agency would directly affect the other. Coordination between the Forest Service and the BLM has taken place to solve mutual problems and to coordinate future changes.

Soil Conservation Service—Agricultural Stabilization and

Conservation Service

Through the Agricultural Stabilization and Conservation Service (ASCS), the Soil Conservation Service (SCS) provides assistance to landowners in the area who want to improve their private rangelands. The ASCS provides cost sharing on fences, water developments, erosion control, and practices to remove woody plant species, while the SCS provides the technical support in planning, surveying, designing and laying out the project. In the Rio Puerco ES Area, their activities and programs are confined to non-Federal lands, and do not conflict with the proposed action.

Fish and Wildlife Service

The Fish and Wildlife Service (FWS) conducts an animal damage control program in cooperation with other Federal and State agencies. Predatory animals and rodents may be controlled on public lands when damages to other resources can be demonstrated. Incidents of animal damage and predation are reported to the FWS, which compiles records of damages and requests authorization to control the problem animals on public lands.

The FWS ensures coordination with state and local agencies which have jurisdiction over wildlife habitat. Identification of endangered plant and animal species is another responsibility of FWS.

Bureau of Indian Affairs

The Bureau of Indian Affairs administers programs in land resource use in cooperation with the Indian Pueblos in the area. It provides technical advice and sponsors a program to maintain range management facilities on tribal lands, as well as on the Zia Community Allotment, the only Indian use allotment in the Rio Puerco ES Area. The Zia Pueblo, with assistance from the BIA, is considering grazing management for its reservation lands. The management of grazing on the reservation would include instituting a grazing permit system and developing and enforcing grazing systems designed to maintain or improve vegetative conditions on the Zia Pueblo Reservation lands.

State Programs Affected

Statewide Comprehensive Outdoor Recreation Plan (SCORP)

The New Mexico State Planning Office has compiled the most current and potentially accurate indication of recreation use patterns for the State. This survey (compiled in 1976) and subsequent recreation demand projections were prepared by State Planning Districts which theoretically guarantees the most reliable indication of existing use and projected demand. While much of the 35 activities identified in the plan do not occur on public lands (see Appendix I-4) the data is useful in order to place those activities that are known to occur on public lands in a proper perspective. The recreation resource used this plan to project recreation use demand in the year 2000.

Other State Programs

In the Rio Puerco ES Area, very few jurisdictional agencies exercise controls or constraints over the land and resources. Development, management, use and control of use on public lands are under the authority of the BLM. To control the use of public lands, the BLM issues authorizations for land uses and monitors the actions to ensure compliance. The New Mexico State Land Board has development and administrative authority over State-owned lands. The State Engineer's Office controls development of surface and subsurface water resources in declared water basins.

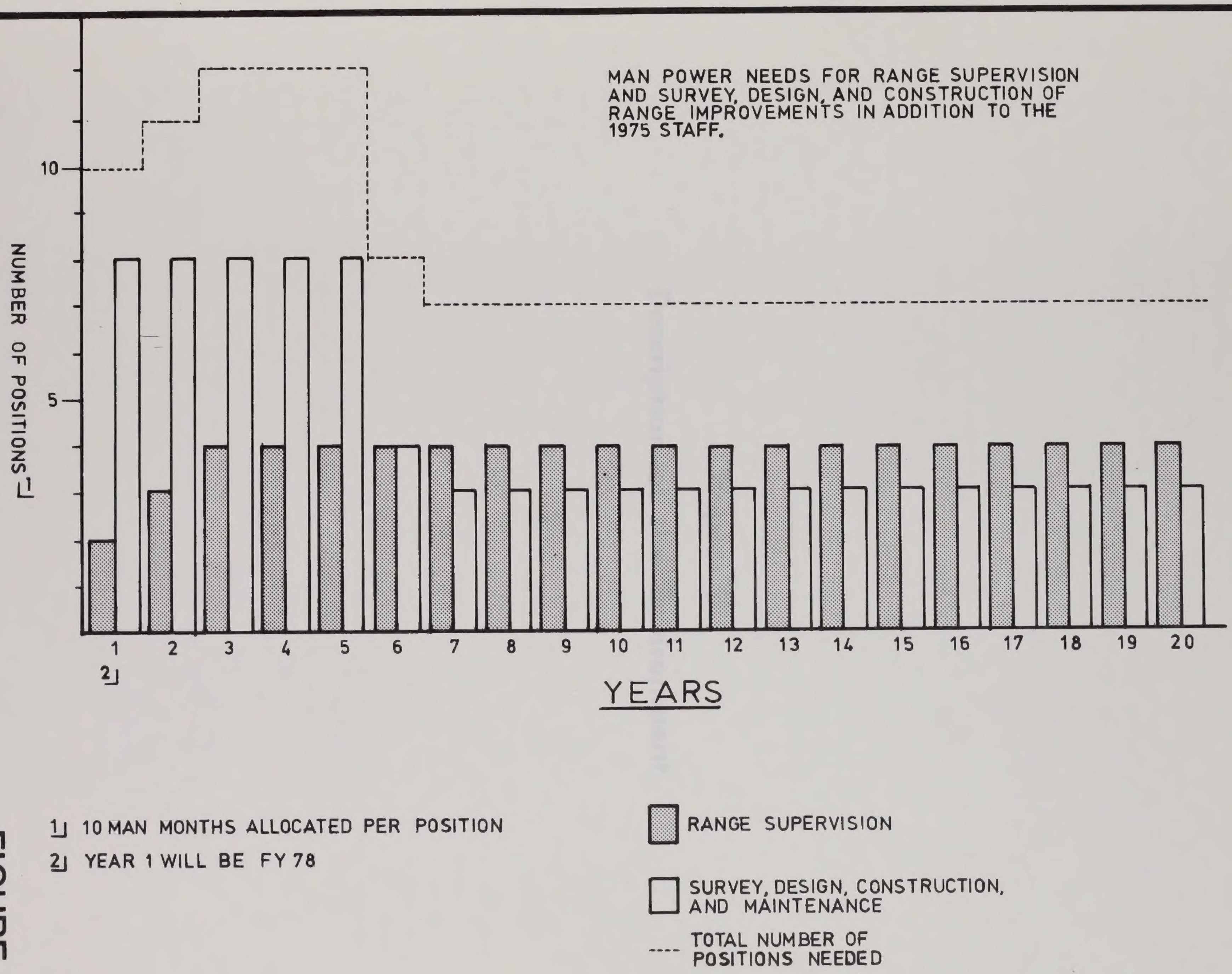
The Rio Puerco ES Area falls within the boundaries of Sandoval and McKinley counties. As of this date, there are no plans for county, city or village zoning or control measures.

Manpower Required

Carrying out of the proposed action would require additional personnel on the Albuquerque District BLM staff for survey, design, construction and maintenance of range improvements and for AMP supervision. Manpower requirements in addition to the 1975 staff are shown in Figure I-9.

In order to implement the proposed action during the first five years, two additional civil engineers and six additional engineering technicians would be employed to survey, design, prepare contracts and supervise construction of the proposed projects, including road easement activities. By the seventh year, five of the positions would be discontinued and the remainder integrated into a maintenance crew employed to maintain the improvements on a regular basis during the year.

Supervision of the proposed AMPs to be implemented during the first year would require two range technicians (employed early in FY77) in addition to the 1975 staff. Two additional range technicians would be employed by the fourth year to supervise, evaluate and revise AMPs. It is anticipated that the staffing level for range administration would be stabilized at this point.



MAN POWER NEEDS FOR RANGE SUPERVISION AND SURVEY, DESIGN, AND CONSTRUCTION OF RANGE IMPROVEMENTS IN ADDITION TO THE 1975 STAFF.

1/ 10 MAN MONTHS ALLOCATED PER POSITION

2/ YEAR 1 WILL BE FY 78

SOURCE: ALBUQUERQUE BLM DISTRICT STAFF

FIGURE I-9

Chapter II

Description of the Environment

CHAPTER II

DESCRIPTION OF THE ENVIRONMENT

EXISTING ENVIRONMENT

The following sections describe the Rio Puerco ES Area as it exists today. Descriptive emphasis has been placed on those items most likely to be impacted if the proposed action is implemented.

Climate

The climate of the Rio Puerco ES Area is semi-arid with distinct precipitation and temperature variations characteristic of a continental climate. Average annual precipitation varies from approximately nine inches at Cabezon to fourteen inches at La Ventana (see Table II-1). Winter precipitation, usually snow, approaches the area in cyclonic or frontal storm systems which are seldom intense enough to bring much moisture into the area. In contrast, summer rains precipitate as convectional thunderstorms of high intensity and short duration.

Temperature in the area has more regularity than precipitation. Generally, summers are cool and pleasant with temperatures exceeding 90 degrees F on only 20 to 25 days and readings over 100 degrees F are almost non-existent. Summer nights are cool and freezing temperatures have been recorded in every month except July. Winter days are generally sunny and moderately warm. There are normally fewer than ten days in any winter when the temperature fails to go above the freezing mark. The average annual temperature for Cuba is 46.4 degrees F. January is the coldest month with an average temperature of 25.7 degrees F and July the warmest, with an average of 68.7 degrees F.

The recorded frost-free period in the ES Area varies from June 4 to September 21, or 109 days, at Cuba to approximately 153 days at the Torreon Navajo Mission from May 8 to October 10. Although temperature records are very limited for this area, the frost-free period may average as high as 170 days in the southeast corner of the area. The shortest recorded frost-free period was 85 days at Cuba in 1962 and the longest was 186 days at Torreon Navajo Mission in 1963. (Climatological data was taken from U.S. Weather Bureau Records.)

Air Quality

The Rio Puerco ES Area contains only one major air drainage basin. This basin is identified by a downward slope from the Continental Divide on the western edge, as well as by the more pronounced downslope of the Nacimiento Mountains on the east. The hourly wind speeds on Cuba Mesa never average more than six miles per hour; however, gusting winds may be greater than 40 miles per hour for short periods of time. Most frequently winds are northwesterly (approximately 21 percent of the time) and approximately 22 percent of the time the area is calm (Keyes, 1976).

The annual average total suspended particles measured near Dulce, New Mexico, the nearest source of data, is about 45 micrograms per cubic meter (Crow, 1973). Noise in the area is very limited; in fact, silence is an important resource. Existing noise elements are those produced by cars and trucks, some farming equipment, such as tractors, and the passage of an occasional aircraft.

Geologic Setting (Map II-1)

The Rio Puerco ES Area is located along the southeastern edge of the San Juan Basin, a physiographic feature within the southeastern part of the larger Colorado plateau. The area is bound on the southeast by the Rio Puerco Fault Zone and on the east by the Nacimiento Mountains which abruptly attain a 9,000-foot elevation because of an uplift along marginal faults. To the north, east, and west, it is bound by the continuation of the San Juan Basin.

The surface consists of rocks ranging in age from Permian to Tertiary. The formations become progressively older toward the southern part of the area. Generally, the beds trend toward the northeast and dip gently to the west and northwest into the San Juan Basin. Younger igneous rocks are interbedded with or overlie Cretaceous sedimentary rocks in much of the southern and southwestern parts of the area.

Resistant sandstone beds form well-defined mesas which rise from 300 to 800 feet over the adjacent areas. Erosion of the less-resistant shales and clays has formed erosional valleys between the mesas, creating an upward stair-stepping effect into the San Juan Basin. In the central part of the area, these mesas are mostly isolated. The igneous rocks are composed of a Tertiary basaltic

Table II-1

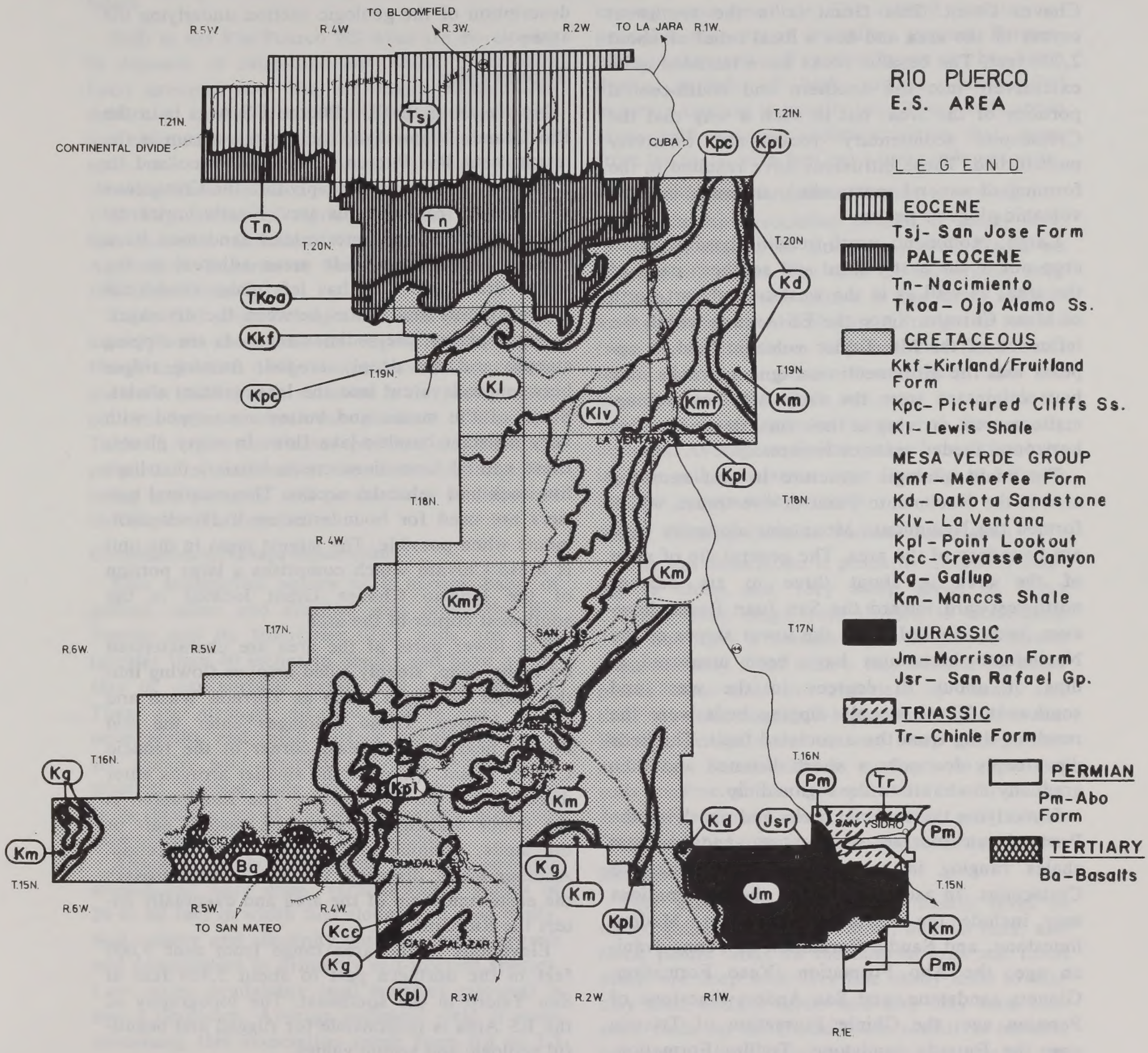
AVERAGE PRECIPITATION PER MONTH IN INCHES RIO PUERCO ES AREA

	Elev. (feet)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVERAGE ANNUAL	YEARS OF RECORD
La Ventana	6450	.78	.32	1.37	1.06	.99	.64	1.37	2.89	1.47	1.56	.40	1.15	14.00	7
Cuba*	6900 6945** 7045**	.86	.72	1.07	.80	.76	.68	2.09	2.49	1.43	1.35	.62	.94	13.81	37
Espiritu Santo Grant	6500	.93	.51	1.05	.87	.90	.64	1.42	2.39	1.20	1.10	.51	.77	12.29	7
Johnson Ranch	7200	.59	.51	.78	.56	.58	.59	1.60	2.26	1.06	1.18	.49	.66	10.86	32
Penistaja	7020	.50	.47	.61	.77	.57	.46	1.69	1.67	.85	.59	.32	.69	9.19	10
Torreon Navajo Mission	6700	.23	.48	.42	.24	.40	.71	1.29	1.96	1.22	.87	.52	.67	9.01	9
Cabezon	6050	.39	.30	.58	.59	.50	.56	1.25	1.88	.98	.84	.51	.46	8.84	20
AVERAGE		.61	.47	.84	.70	.67	.62	1.53	2.22	1.17	1.07	.48	.76	11.14	

*Location of Station Moved in 1952 to 6945** feet and in 1957 to 7045** feet.

Source: U.S. Weather Bureau, Climatological Record.

GEOLOGICAL SETTING



SOURCE: FROEHLICH, KUES, LUCAS & OLMO, 1975

MAP II-1

flow and Tertiary-Cretaceous intrusions of basaltic composition.

A basaltic flow, originating in and extending from the Mt. Taylor volcanic field southwestward from the area, forms the cap of Mesa Chivato and fingers into the central portion of the Ignacio Chavez Grant. This Grant is in the southwest corner of the area and has a local relief of about 2,200 feet. The basaltic rocks have intruded quite extensively into the southern and south-central portions of the area, but in such a way that the Cretaceous sedimentary rocks are relatively undisturbed. These intrusions have resulted in the forming of several outstanding, unusual, isolated volcanic plugs or peaks.

Large, prominent, north-trending basaltic dikes crop out in the east-central and southern parts of the area, as well as in the west-central part north of Mesa Chivato. Since the ES Area is within the influence of the Mt. Taylor volcanic field, it appears that the aforementioned igneous rocks may have originated from the same Mt. Taylor magmatic source, arriving at their final destination via horizontal feeder vents or fissures.

The main geologic structure in and near the area is the Nacimiento Fault or overthrust, which formed the Nacimiento Mountains along the eastern boundary of the area. The general dip of most of the area is about three to six degrees northwestward toward the San Juan Basin; however, beds exposed along the lower slopes of the Nacimiento Mountains have been measured at dips of about 70 degrees to the west and southwest. These steeply dipping beds were the result of drag from the associated fault. The beds dip steeply for only a short distance and then gradually moderate to the regional dip.

Underlying the surficial rocks and overlying the Precambrian floor are sedimentary sandstone and shales ranging in age from Pennsylvanian to Cretaceous. In ascending order, these formations may include the Hermosa Formation, Madero limestone, and Sandia Formation of Pennsylvanian age; the Abo Formation, Yeso Formation, Gloueta sandstone, and San Andres limestone of Permian age; the Chinle Formation of Triassic age; the Entrada sandstone, Todilto Formation, and Dakota Formation of Cretaceous age. A similar sequence of sediments can be viewed to the east along the west side and atop the Nacimiento Mountains.

The structure of the area other than the igneous intrusives is limited to the recent northeast-trending vertical faults of relatively small displacement located in the southern and central parts of the area. Supplementary Reference II-1 in the Albuquerque District Office contains the generalized description of the geologic section underlying the area.

Topography

Nearly all of the Rio Puerco ES Area is in the Rio Grande Watershed; the master stream is the intermittent Rio Puerco. The Rio Puerco and its tributaries have eroded deeply into the Cretaceous and Tertiary rocks in this area. Nearly horizontal units of shales and interbedded sandstone have been removed from wide areas adjacent to the major drainages. This has left many sandstone-capped mesas and buttes between the drainages. In some places, the sedimentary beds are dipping steeply and are deeply eroded, forming ridges between valleys cut into the less-resistant shales. Some of the mesas and buttes are capped with very resistant basaltic lava flow. In many places, these natural formations create barriers that limit livestock and vehicular access. These natural barriers are used for boundaries on livestock allotments when possible. The largest mesa in the unit is Mesa Chivato which comprises a large portion of the Ignacio Chavez Grant located in the southwest corner of the area.

The lower parts of the area are characterized by many deep, steeply sided arroyos flowing into the major drainages, such as Torreon Wash and Chico Arroyo. These drainages enter the Rio Puerco near the northeast corner of the Ignacio Chavez Grant. Many of the smaller arroyos enter directly into the Rio Puerco. The Rio Puerco is the major drainage crossing the eastern part of the lands, draining in a southeasterly direction. Another major drainage, the Rio Salado, crosses the easternmost tip of the area and eventually enters the Rio Grande.

Elevations in the area range from near 9,000 feet in the northern part to about 5,450 feet at San Ysidro in the southeast. The topography of the ES Area is responsible for rugged and beautiful geologic and scenic values.

The most prominent volcanic formation is Cabezon Peak, a volcanic plug that reaches an elevation of about 8,000 feet. There are several other volcanic peaks in the southern part of the

ES Area. Other prominent and scenic formations include Guadalupe Peak and Bear's Mouth. The main topographic structure near the ES Area is the Nacimiento Mountain range formed by the Nacimiento Fault.

Soils

Soils in the Rio Puerco ES Area are developing in deposits of sandstone and shale. They have been grouped into the six major associations delineated in the area. Table II-2 gives acreages and estimated weighted average sediment yield of each soil association. A soil association map showing their location was prepared from the U.S. Department of Agriculture, Soil Conservation Service, Cabezon Area Soil Survey and Agriculture Experiment Station Research Report 188. (See Visual B.)

Table II-3 gives average sediment yield of soil associations as related to vegetative sub-types. North and south designations show differences in sediment yield due to variation in the precipitation patterns between these two portions of the area. Table II-4 gives estimated physical and chemical properties of each soil in the six associations. Existing and potential soil productivity is discussed in Chapter III, Vegetation.

Christianburg-Navajo Association

This association occurs as a narrow band of gullied, saline and alkaline soils along the Rio Puerco and its tributaries. The soils are deep (greater than 40 inches in depth) and have a silty clay or clay surface texture and a clay subsoil. They are strongly alkaline, having very slow permeability and rapid surface runoff. The soils are usually well drained, although certain locations of Navajo soils are poorly drained. Slick spots (small areas of soil with extremely high concentrations of alkali salts) are common.

Although nearly level, these soils are severely eroded and have deep, vertical-walled gullies of 20 to 40 feet in width that slough and pipe easily. Soil salinity and alkalinity limit vegetative growth and composition to primarily salt-tolerant species. Low water availability (soil moisture content) is also a limitation. Average sediment yield in areas containing this association range from 0.8 to 2.5 acre feet per square mile per year (Table II-3).

Litle-Las Lucas Association

The soils of this association occur on rolling or hilly uplands and low shale hills. Soils on the uplands are deep to moderately deep (30 to 40 inches in depth) and have clay or clay loam subsoils, while soils on the low shale hills are shallow to very shallow (less than 20 inches deep) with clay loam subsoils that grade into shale. Soils are moderately alkaline with the surface layer containing some free lime. The subsoil contains appreciable amounts of crystalline gypsum. Permeability is slow and soil erosion losses can be severe during periods of high surface runoff. Soil moisture content is usually low. These soils are in areas with average sediment yields that range from 0.6 to 2.6 acre feet per square mile per year.

Penistaja-Berent-Sandstone Outcrop Association

Soils in this association consist of nearly level to rolling, slightly to moderately eroded soils on uplands and ridges. The soils are moderately deep to deep. Surface soil texture is fine sandy loam to loamy fine sand; subsoil material ranges in texture from sandy clay loam to loamy fine sand. Scattered slick spots occur. Permeability rates are moderate to rapid. Soils are very susceptible to wind and water erosion because of their sandy textures. Average sediment yields from areas having this soil association range from 0.4 to 1.9 acre feet per square mile per year.

Basalt Outcrop-Cabezon-Torreon Association

This soil association is primarily on gently sloping to steep and very steep areas of Mesa Chivato. Soils range from shallow to moderately deep and have a surface layer of grayish-brown loam or stony loam with a clay subsoil. In some places these soils are underlain by basalt, and their substrata contain a high percentage of stone. Basalt outcrops occur as very steep escarpments and plugs. Permeability is moderate to slow and soils are free of lime to depths of 15 to 30 inches. Average sediment yield from this area ranges from 0.2 to 0.4 acre feet per square mile per year.

Billings-Persayo Association

This association consists of nearly level to steep, gullied soils on foothills, alluvial fans, and flood plains. Soils on the alluvial fans and flood plains are deep with very fine sandy loam to silty clay loam surface layers and silty clay loam subsoils. Soils on the foothills are similar in texture, but are shallow over sandstone. In places, the soils have stony surface layers. Permeability rate in these soils is slow. These soils are in an area having average sediment yields ranging from 0.8 to 2.5 acre feet per square mile per year.

Table II-2

ESTIMATED WEIGHTED AVERAGE SEDIMENT YIELD BY SOIL ASSOCIATIONS WITHIN THE RIO PUERCO ES AREA

Soil Number[a]	Soil Associations (% Slopes)	Acres	Square Miles	Present Yield: Acre-feet Square Mile per Year	Present Yield: Acre Feet per Year	Present Yield: Tons Square Mile per Year
1	Christianburg-Navajo (0-3%)	32,265	50.4	0.9	45	1,530
2	Litle-Las Lucas (1-15%)	94,030	146.9	0.7	103	1,170
3	Penistaja-Berent-Sandstone (0-60%)	88,675	138.6	0.5	69	810
4	Basalt Outcrop-Cabezon-Torreon (9-75%)	31,495	49.2	0.4	20	630
5	Billings-Persayo (1-25%)	93,355	145.9	0.9	131	1,620
6	Travessilla-Persayo (3-25%)	172,096	268.9	0.7	188	1,170
		511,916				

[a] Soil Number as used on Visual B

Source: Soil Conservation Service; Cabezon Soil Survey, 1971

Table II-3

AVERAGE SEDIMENT YIELD FROM DIFFERENT SOIL ASSOCIATIONS AND VEGETATIVE SUB-TYPES

ACRE FOOT/SQUARE MILE/YEAR

		Shortgrass	Ponderosa Pine	Four-wing Saltbush	Greasewood	Big Sagebrush	Pinyon-Juniper	Steep and Rocky	Barren	Broom Snakeweed
Christianburg-Navajo	Entire Area	0.8	-	0.8	0.9	-	-	-	2.5	-
Litle-Las Lucas	North	0.6	0.7	-	-	0.6	0.6	0.7	-	-
	South	0.7	-	0.7	0.7	-	0.7	0.6	2.6	0.7
Penistaja-Berent-Sandstone Outcrop	North Only	0.4	0.5	-	-	0.4	0.4	0.5	1.9	-
Basalt Outcrop-Cabezon	South Only	0.4	0.3	-	-	-	0.3	0.2	-	-
Billings-Persayo	North	1.0	0.9	-	-	0.9	0.8	0.9	-	-
	South	0.9	-	0.9	-	-	0.8	0.9	2.5	0.9
Travessilla-Persayo	North	-	0.6	-	-	0.6	0.6	0.6	-	-
	South	0.7	-	0.6	0.7	0.7	0.6	0.5	2.1	0.6

Source: Estimated by BLM Staff Specialist utilizing methods from Soil Conservation Service, U.S. Geological Survey and U.S. Forest Service.

Table II-4

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES OF SOIL ASSOCIATIONS
RIO PUERCO ES AREA

Series Name	Depth To Bedrock (in)	Depth From Bedrock (in)	USDA Texture	Permeability (in. per hr.)	Available Water Holding Capacity (in. per in. soil)	Reaction pH	Salinity	Dispersion	Shrink-Swell Potential
Basalt Outcrop	-	-	-	-	-	-	-	-	-
Berent	36-60	0-9	Loamy Fine Sand	2.5 - 7.5	0.10	7.1 - 7.3	Slight	Moderate	Moderate
		9-18	Loamy Sand	2.5 - 7.5	0.10	7.9 - 8.4	Slight	Moderate	Moderate
		18-60	Loamy Sand	2.5 - 7.5	0.10	8.5 - 9.0	Slight	Moderate	Moderate
Billings	72	0-4	Silty Clay Loam	0.50-2.50	0.17	8.0 - 8.4	Slight	Moderate	Moderate
		4-27	Clay Loam	0.05-0.50	0.17	8.2 - 8.6	Slight	Low	High
		27-45	Silty Clay Loam	0.05-0.50	0.17	8.4 - 8.8	Slight	Low	High
Cabezon	8-16	0-3	Stony Loam	0.50-2.50	0.09	6.6 - 7.3	Non-Saline	Low	Moderate
		3-12	Clay	0.50-2.50	0.17	6.6 - 7.3	Non-Saline	Low	High
		12	Basalt-Bedrock	-	-	-	-	-	-
Christianburg	72	0-60	Clay	0.00-0.05	0.17	8-5 - 9.0	Moderate	Low	High
Las Lucas	6-72	0-4	Clay	0.80-2.50	0.17	7.9 - 8.4	Slight	Moderate	Moderate
		4-23	Clay Loam	0.80-2.50	0.17	7.9 - 8.4	Slight	Moderate	High
		23-60	Light Clay	0.80-2.50	0.17	7.9 - 8.4	Slight	Moderate	High
Litle	14-24	0-5	Silty Clay	0.05-0.50	0.17	7.9 - 8.4	Slight	Low	High
		5-20	Silty Clay	0.05-0.50	0.17	8.5 - 9.0	Slight	Low	High
Navajo	72	0-6	Clay	0.00-0.05	0.18	8.5 - 9.0	Slight	Moderate	High
		6-31	Clay	0.00-0.05	0.18	8.5 - 9.0	Severe	Moderate	High
Penistaja	72	0-6	Fine Sandy Loam	2.50-7.50	0.13	7.9 - 8.4	Slight	Moderate	Low
		6-21	Sandy Clay Loam	0.50-2.50	0.17	7.9 - 8.4	Slight	Moderate	Moderate
		21-45	Sandy Loam	2.50-7.50	0.13	7.0 - 8.4	Slight	High	Low
		45	Sandy Loam	-	-	-	-	-	-
Persayo	0-16	0-6	Silty Clay Loam	0.50-2.50	0.17	7.9 - 8.4	Slight	Low	Moderate
		6-14	Silty Clay Loam	0.00-0.05	0.17	7.9 - 8.4	Slight	Low	High
Sandstone Outcrop	-	-	-	-	-	-	-	-	-
Torreon	>60	0-13	Loam	0.50-2.50	0.17	6.6 - 7.3	Non-Saline	Low	Moderate
		13-38	Clay	0.05-0.20	0.17	6.6 - 7.3	Non-Saline	Low	High
		38-60	Clay Loam	0.50-2.50	0.17	6.6 - 7.3	Non-Saline	Low	Moderate
Travessilla	6-16	0-8	Fine Sandy Loam	2.50-7.50	0.18	7.9 - 8.4	Slight	Moderate	Low
		8	Sandstone						

No estimate of properties was made for Basalt Outcrop-Sandstone Outcrop. These land types are not mapped separately but are a part of other mapping units such as Cabezon, Berent, Billings, etc.

Source: Soil Conservation Service; Cabezon Soil Survey, 1971

Travessilla-Persayo Assocation

This soil association occurs on strongly sloping to steep mesas and breaks. These soils are shallow, with surface soil texture ranging from sandy loam to silty clay loam. The subsoil texture ranges from silty clay loam to sandy clay loam that grades into sandstone and shale. The soils are mildly alkaline, with free lime present to the surface. The association is dissected by many intermittent drainages, and rock outcrops and escarpments are common. Average sediment yield in this area ranges from 0.5 to 2.1 acre feet per square mile per year.

Erosion Condition

Present erosion condition classes within the soil associations have been developed based on soil surface factors obtained from vegetative transect data (see Map II-2).

The most common naturally occurring soil problems include wind and water erosion hazards due to parent material characteristics, low available soil moisture and soil textures with high sand or clay content. Clayey textured soils have high shrink-swell potentials, slow infiltration rates, and reduced plant-available soil moisture. Many of the soils and parent materials are saline and/or alkaline, and not conducive to plant growth.

Runoff and Sedimentation

Several data sources provide runoff rates and sedimentation for locations representative of the ES Area. Differences in these rates result from soil variability, location of recording devices, method of analysis and length of record.

A cooperative study of the upper Rio Grande by USDA and the New Mexico State Engineer found sediment yields of 1.0 to 3.0 acre feet per square mile per year for most of the area (USDA, SCS, FS, ERS, 1974). Forest Service studies of the San Luis Watershed in New Mexico from 1951-1959 indicate a value of 0.7 acre foot per square mile per year for that area (Aldon 1973 and Keyes 1976). Geologic Survey studies of Cornfield Wash indicate annual sedimentation values of about 1.9 acre feet per square mile per year for the period 1951-1960 (Burkham, 1966). Corp of Engineers reports on U.S. Geologic Survey stream gauges provide values of 0.7, 1.6 and 1.08 acre feet per square mile per year at Bernardo, Cabezon and Chico Arroyo respectively (Corp of Engineers, June 1972). The Bernardo gauge period of record is 1939 to 1966. Records from the other two gauges cover nine years ending in 1956. Suspended sediment values, however, give a misleading picture of sediment yield from study areas. This is because channels originate outside the area and just pass through. In many cases, measurements were made off the ES Area. In an analysis using the Pacific Southwest Inter-Agency Committee (PSIAC) method, calibration was made using the San Luis and Cornfield Wash studies where range and sediment transects were available. These studies were direct measurements of sediment production from the respective areas, and reflect a more realistic picture of what may be happening.

Estimates calculated by the PSIAC method are approximations of the actual sedimentation yield values. The figures show order of magnitude and the relative differences between vegetative subtypes and soil associations (Table II-3).

Steep and rocky and barren vegetative subtypes on soils were not analyzed because of their limited occurrence and the fact that new management practices would not produce appreciable sediment yield changes. Erosion by soil blowing is evident in the area, but cannot be quantified at present.

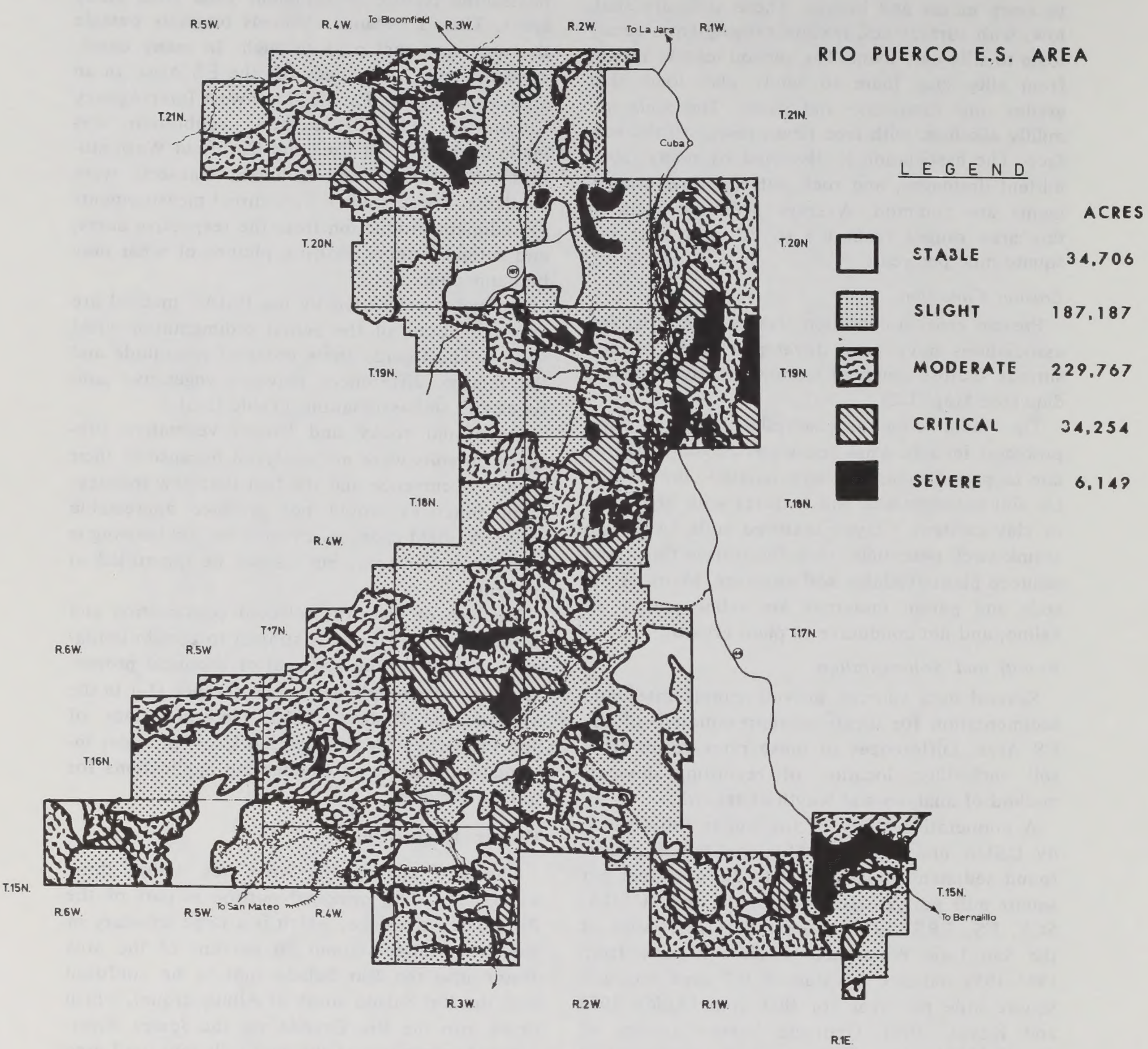
The use of soils for selected construction and development purposes is subject to certain limitations caused by the physical or chemical properties of a soil. Supplementary Reference II-1 in the Albuquerque District Office (Interpretations of Soil Properties for Engineering Uses) provides information relative to engineering applications for soils in the area.

Water Resources

The Rio Puerco ES Area lies within three watersheds. The principal portion is part of the Rio Puerco drainage, which is a large tributary of the Rio Grande. About 20 percent of the area drains into the Rio Salado (not to be confused with the Rio Salado south of Albuquerque), which flows into the Rio Grande via the Jemez River. About two percent of the area falls into the Largo Watershed of the San Juan River Basin.

Surface water is relatively scarce in the area. Most channels contain flows only after localized, high intensity rainstorms. Occasionally, large storm systems generate runoff in all of the channels for a few days. A few of the higher tributaries of the Rio Puerco and Rio Salado flow intermittently during snowmelt.

PRESENT EROSION CONDITIONS



SOURCE: 1975 RESOURCE INVENTORY

MAP II-2

No natural lakes or ponds occur within the area. Impoundments, such as reservoirs, are often undependable as permanent sources of water. This results from frequent periods of drought, sediment deposits that reduce water holding capacity, and loss of water by seepage. Carefully designed and located impoundments, however, do provide reliable year-round water.

The total amount of available groundwater within the area is unknown. Insufficient groundwater has been developed for livestock and domestic watering facilities under present conditions, but this has been due to economic considerations rather than the absence of groundwater. Surface waters are generally high in total dissolved solids, and surface flows carry large amounts of suspended sediments. The quality of groundwater varies greatly, ranging from good to extremely saline.

Quantity of Surface Water

Water yields from the area are difficult to describe. They vary widely from year to year. Flash flooding is common. The higher elevations produce more water than the lowlands, and small watersheds yield more water per unit of area than do large ones.

Average annual water yields from most of the area fall between 0.1 and 0.5 inch, with the northern end generally yielding the higher amounts. Areas near the Continental Divide and the higher parts of Mesa Chivato probably yield between one and three inches annually. These estimates are based upon a water yield map by the Soil Conservation Service (USDA, SCS, 1973), stream flow measurements by the U.S. Geological Survey (USGS), and small watershed studies by the U.S. Forest Service (Aldon, 1973) and the USGS (Burkham, 1966).

The streamflow records show that yields vary considerably from one year to the next. A gauge on the Rio Puerco just above the confluence with Chico Arroyo measured only 0.03 inch of runoff from October 1973 to October 1974. In contrast, 1.3 inches were measured during the same period of 1958.

The size of drainage area also has an influence on water yields. Burkham developed an empirical equation from the USGS Cornfield Wash Study (Burkham, 1966). This equation predicts average seasonal runoff in the Cornfield Wash vicinity, based upon size of drainage area. Thus, average May-October runoff from a ten square mile watershed is estimated at 0.4 inch. In contrast, a drainage of 0.1 square mile is expected to yield 0.8 inch. This difference is attributed to greater absorbtion of water by channel bottoms and banks (transit losses), as water flows down the longer channels of the larger watersheds.

Streamflow in the main drainages is primarily the result of intense rainfall. On the average, August is the heaviest runoff month, although a significant amount of flow in the upper Rio Puerco occurs in May as the result of snowmelt in the uppermost headwaters. Figure II-1 depicts the average monthly distribution of streamflow on the Rio Puerco and Arroyo Chico (Keyes, 1976).

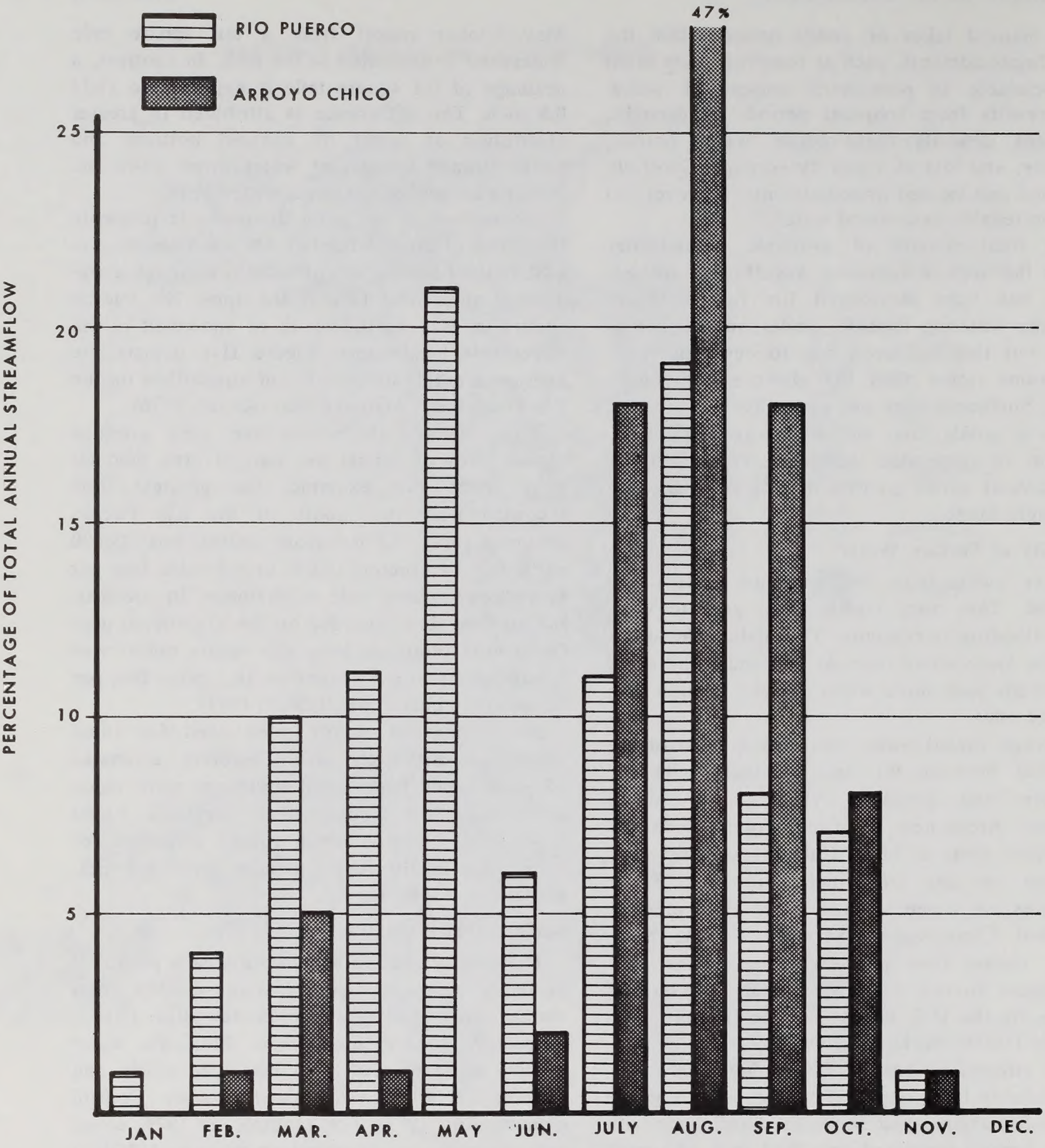
Small watersheds within the area produce higher rates of runoff per unit of area than do large ones. For example, the greatest flow recorded near the mouth of the Rio Puerco (drainage area 7,350 square miles) was 35,000 cubic feet per second (CFS) or 4.8 cubic feet per second per square mile of drainage. In contrast, the greatest flow recorded on the Rio Puerco near Guadalupe (drainage area 420 square miles) was 6,940 cubic feet per second or 16.5 cubic feet per second per square mile (USGS, 1974).

No records of runoff rates exist for small watersheds within the area. Therefore, estimates of peak flows from small drainages were made using the Soil Conservation Service's Flood Hydrograph Method. Peak runoff estimates for watersheds in different vegetative types are summarized in Table II-5.

Surface Water Quality

The quality of runoff from the area is poor, yet probably representative of water quality from similar arid lands. Water in the Rio Puerco frequently cannot meet New Mexico's water quality standards for total dissolved solids and sulfates (New Mexico Water Quality Control Commission, 1973). For example, in 1973, seven measurements out of seventeen taken by USGS at the mouth of the Rio Puerco exceeded the State standard of 1,500 milligrams per liter of total dissolved solids. All measurements of sulfate exceeded the State standard. The highest concentration measured was 1,300 milligrams per liter, which is more than two and one-half times the standard of 500 milligrams per liter.

No State standards for sediment have been established, but the Rio Puerco often contains



DISTRIBUTION OF ANNUAL STREAMFLOW AT RIO PUERCO ABOVE ARROYO CHICO NEAR GUADALUPE, NEW MEXICO AND AT ARROYO CHICO NEAR GUADALUPE, NEW MEXICO (1951 - 1974)

ANNUAL STREAMFLOW DISTRIBUTION

SOURCE: KEYES, 1976

FIGURE II-1

Table II-5

ESTIMATES OF PEAK RUNOFF FROM WATERSHEDS ONE SQUARE MILE IN SIZE

	1/ Computed Peak Flow In CFS/mi^2		
Vegetative Sub-Type	2 Year Storm	10 Year Storm	50 Year Storm
Ponderosa pine	40	110	210
Big sagebrush	40	80	150
Four-wing saltbush	60	180	350
Greasewood	80	205	390
Shortgrass	85	200	380
Broom snakeweed	80	220	450
Pinyon-juniper	55	125	230
Steep and Rocky	260	550	855
Barren	220	445	715

	2/ Computed Peak Flow In CFS/mi^2		
Soil Association	2 Year Storm	10 Year Storm	50 Year Storm
Christianburg-Navajo	60	180	410
Litle-Las Lucas	40	140	290
Penistaja-Berent-Sandstone	100	160	240
Basalt Outcrop-Cabezon-Torreon	170	300	490
Billings-Persayo	40	140	310
Travessilla-Persayo	90	200	350

1/ Weighted average from six soil associations.
2/ Weighted average from nine vegetative sub-types.

Source: U.S. Department of Agriculture; Soil Conservation Service, Forest Service, Energy Resources Satellite, 1974
BLM Staff Hydrologist
BLM Staff Soil Scientist

concentrations that are high by any criteria. Suspended sediment concentrations of as much as 267,000 milligrams per liter have been measured near the mouth of the watershed. The channels of the Rio Puerco and its tributaries are deeply incised and generally in very poor condition. The main valley bottoms are in the latter stages of an erosion cycle that was apparently initiated in the late 1800s and early 1900s.

In the main drainages, the channels have cut down to bedrock, or to a point where downcutting and resistive forces are offsetting. In places, the channel bottom has been lowered by as much as 50 feet. Presently, the main channels are widening. As a steep, raw bank is undercut and falls into the channel, the flow is diverted and begins to undercut another bank, which falls in its turn. This process will continue until the channel is so wide that the water flows will lose the erosive forces needed to undercut the banks. Many of the smaller tributary channels are in a more youthful state of development. Here, channel downcutting is still occurring and deep headcuts are common.

The magnitude of erosion in channels is unknown, but it is estimated to contribute about half of the sediment that is carried by the Rio Puerco. There is no record of chemical quality or sediment measurements on the Rio Salado. From its name, (salado means salty) one would expect very high levels of total dissolved solids. Channel conditions on the Salado drainage are similar to those on the Rio Puerco.

Estimates of sediment production from nine vegetative sub-types in the ES Area range from 0.3 acre feet per square mile to 2.6 acre feet per square mile. These estimates compare with measured sediment yields of 0.7 acre feet per square mile at the San Luis watershed study area and 1.9 acre feet per square mile from the USGS Cornfield Wash Study.

Little is known of the bacteriological quality of water in the area; however, samples taken from stock water ponds in June 1976, show total coliform counts ranging in concentration from zero to over 16,850 per 100 milliliters of water (Barkley, 1976).

Groundwater Quantity

The quantity of available groundwater within the ES Area is unknown, except in general terms. Most of the bedrock aquifers usually yield small to moderate quantities of water. However, a groundwater study on the nearby Jicarilla Indian reservation indicates that locally heavy yields are possible in certain locations (Baltz and West, 1967).

There is some artesian water within the area, but its extent is unknown. Uranium exploration drill holes encountered artesian water in the southwest part of the area at depths around 500 feet. BLM is developing one of these sources to provide water for wildlife and livestock in several allotments. The alluvial deposits in the valley bottoms provide a source of groundwater, but the quality is quite variable (BLM, 1971).

Most of the alluvial aquifers in the area are fed by local precipitation and runoff. Bedrock aquifers are recharged by precipitation wherever they outcrop. In many cases, these locations are outside the area boundary. Streamflow helps recharge bedrock aquifers where they outcrop in channels. Conditions over much of the area are not conducive to groundwater recharge. Lack of ground cover tends to decrease infiltration and percolation and promotes rapid surface runoff.

Groundwater Quality

Little or no data has been compiled concerning the quality of groundwater within the area. The USGS groundwater study on the nearby Jicarilla Apache Reservation states that water quality in that area varies widely. The report also says that not only does chemical quality differ from one stratographic unit to another, it also differs within the same unit (Baltz and West, 1967). Most of the aquifers mentioned in the USGS study are encountered in the area.

A limited number of water quality tests taken during June 1976, indicate that groundwater quality conditions are similar to those found on the Jicarilla Reservation (Barkley, 1976). Most of the water samples analyzed in the USGS study were chemically similar. That is, the waters were high in sodium, relative to calcium, magnesium and sulfate. Most of the waters were undesirable for domestic use due to high concentrations of sulfates and other dissolved solids. However, the concentrations were not high enough to classify most of the water as impotable. Nearly all of the water was found to be acceptable for livestock use. Some of the water was unsuitable for irrigation due to excess sodium.

In summary, based upon the climatological characteristics and the aquifers found within the area, the quality of groundwater is thought to be quite variable. Most of the water should be potable, but not desirable, for domestic use. Almost all of the water is expected to be usable for livestock and the suitability for irrigation probably varies with sodium concentrations.

Use and Importance of Surface and Ground Waters

Drinking water for livestock is an important onsite use of water in the Rio Puerco ES Area. The location of available water heavily influences the distribution of livestock. Water developed for livestock is also used by wildlife.

Current groundwater withdrawal from 48 wells and 26 developed springs is estimated at 55 acre feet annually. In addition 200 stockwater reservoirs are in the area. One hundred eighty-four detention dams (erosion control structures) provide temporary water storage after heavy rain storms. Intermittent streamflows leave scattered temporary pools of water in the channel bottoms. The importance of these pools as livestock water is not known.

There is limited irrigation within the ES Area. Historical records, however, indicate that irrigation was practiced in the main valley bottoms from about 1700 to 1900 (Calkins 1937, Rittenhouse 1965).

Runoff from the Rio Puerco contributes to the flow of the Rio Grande. The Rio Puerco accounts for about eight percent of the mean annual flow of the Rio Grande. Most of this water is utilized by downstream appropriators for irrigation, or helps meet the water required by international treaty with Mexico.

Domestic use of water is slight. Fewer than 400 persons live in this large area. Many of the homes are without inside plumbing, which indicates that per capita consumption of water is low. Some families haul in their drinking water due to the poor quality of water from the household well or spring.

Water Rights

New Mexico's water is ajudicated under the Appropriation Doctrine, which is based upon the principle, 'first in time, first in right.' Both surface and ground waters are subject to appropriation, and rights are administered by the State Engineer.

The area is part of a designated groundwater basin. This means that groundwater cannot be developed and put to beneficial use without a permit from the State Engineer. The public must be notified of proposed groundwater appropriations by publication of each application in a newspaper (State Engineer of New Mexico, 1966).

The appropriation statutes do not apply to livestock tanks or ponds that are less than ten acre feet in capacity. The owners, however, are responsible for any damage to prior water rights that may result from the existence of such stock ponds.

In like manner, erosion control structures are exempt from the statutes, provided they impound only temporary or 'detention' storage of surface water, and are not detrimental to other water rights.

Vegetation

The Rio Puerco ES Area has nine vegetative sub-types. Sub-types are in accordance with BLM Manual designations for vegetative types and subtypes. Types and sub-types are determined by the dominant plant in the current aspect, as seen by the viewer. The vegetative sub-types in the area are: ponderosa pine, big sagebrush, four-wing saltbush, greasewood, shortgrass, broom snakeweed, pinyon-juniper, steep and rocky, and barren.

The area had an extensive Resource Inventory in 1975. Pace point transects were used to gather data on ground cover including forage and total vegetation; litter; small and large rock; and bare ground. Other information collected included erosion condition; vegetative composition; effective root depth; and soil texture. This data has been used in describing the different vegetative subtypes found in the area. Visual B depicts vegetative sub-types as correlated to soil associations; Table II-6 illustrates the average percentage of the composition for these sub-types and also lists major species. Table II-7 lists the average percent of ground cover. No forbs are listed in Table II-6. Many are present only in trace amounts, and although they were frequently observed in the area, they were not recorded on transects. Supplementary Reference II-3 in the Albuquerque District Office lists known vegetative species found in the Rio Puerco ES Area.

Table II-6

AVERAGE PERCENT OF COMPOSITION FOR VEGETATIVE SUB-TYPES

	Ponderosa Pine (North)	Ponderosa Pine (South)	Big Sagebrush	Treated Big Sagebrush	Four-wing Saltbush	Grease-wood	Short-grass	Treated Shortgrass	Broom Snakeweed	Pinyon-Juniper	Treated Pinyon-Juniper	Steep and Rocky	Barren
GRASSES:													
Blue grama	12	6	19	30	5	2	21	21	17	14	32	15	5
Western wheatgrass	2	3	4	7		3	2				5		
Junegrass	2	4											37
Galleta			7	11	5	2	23	20	15	6	9	11	
Bottlebrush squirreltail								4	2		3		
Crested wheatgrass				7				5			3		
Alkali sacaton			3	3	15	18	26	5				4	
Red threeawn								2	2			2	
Sandhill muhly													16
Ring muhly							2	6	4				
Indian ricegrass								2				2	5
Sand dropseed					2		3						5
SHRUBS:													
Gambel oak & Oak Species	12	23								3			
Mountain-mahogany	3												
Big sagebrush	3		51	33						9	35	5	
Black sagebrush	2										2		
Fringe sagebrush								2				2	
Skunkbush		2											
Four-wing saltbush					58	3	3	2	2			2	16
Shadscale					2	8	3					13	
Winterfat							2	5					
Greasewood			2		2	56							
Rabbitbrush			2										
Broom snakeweed		4	3	4	5	2		19	51	5	5	7	5
Cactus Species						2							
TREES:													
Ponderosa pine	42	29											
Pinyon pine	9	21								23		9	
Juniper Species	8	5						2		27	2	16	11
OTHER*	5	3	9	5	6	4	15	5	7	13	4	12	0

*Species with percentages of one and below are not displayed.

Source: 1975 BLM Resource Inventory

Table II-7

AVERAGE PERCENT GROUND COVER BY VEGETATIVE SUB-TYPE

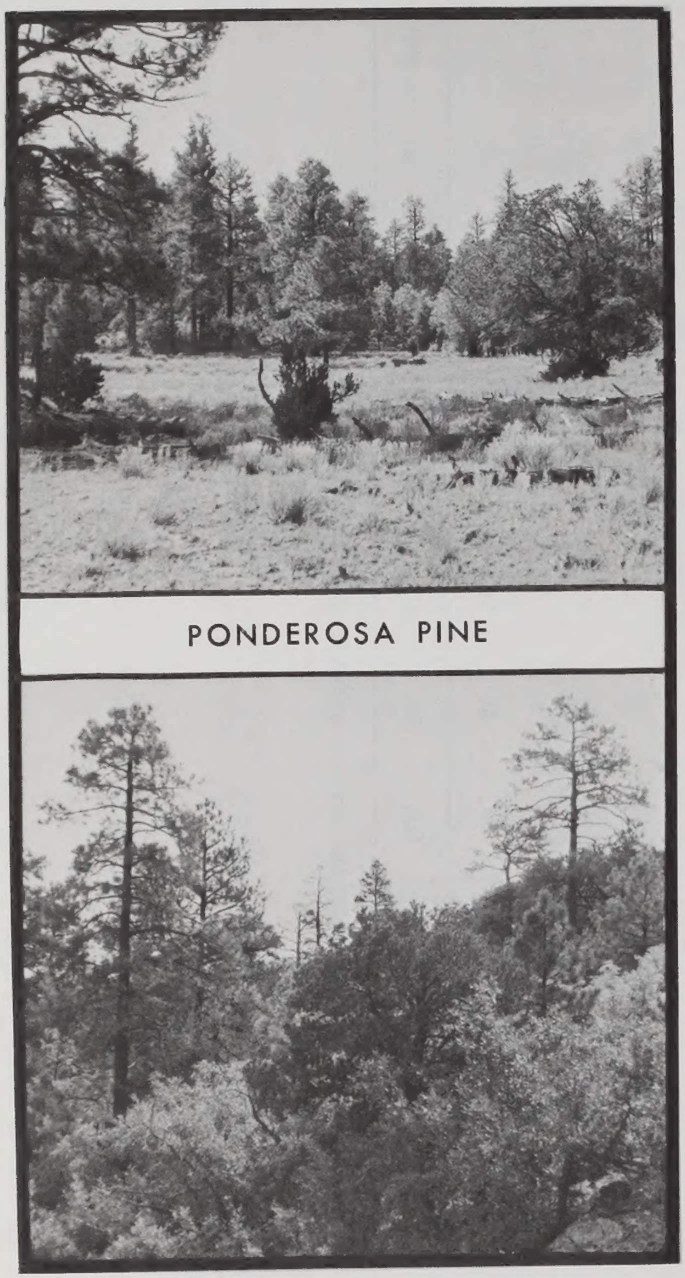
	Ponderosa Pine (North)	Ponderosa Pine (South)	Big Sagebrush	Treated Big Sagebrush	Four-wing Saltbush	Grease-wood	Short-grass	Treated Shortgrass	Broom Snake-weed	Pinyon-Juniper	Treated Pinyon-Juniper	Steep and Rocky	Barren
Forage Vegetation*	14	8	28	21	31	27	19	21	15	13	21	9	4
Total Vegetation	30	32	31	22	33	29	22	28	31	30	23	13	7
Litter	33	33	27	36	28	25	23	17	19	21	44	7	9
Small & Large Rocks	12	9	1	0	2	0	7	3	4	16	0	49	16
Bare Ground	25	26	41	42	37	46	48	52	46	33	33	31	68
Erosion Condition Class**	Mod	Sl	Mod	Sl	Mod	Mod	Sl	Sl	Sl	Mod	Sl	Mod	Se

*Forage Vegetation = Vegetation which is used as forage by grazing animals and is a portion of total vegetation.

**Erosion Condition Classes: Stable = St
Slight = Sl
Moderate = Mod
Critical = Cr
Severe = Se

Source: 1975 BLM Resource Inventory

Ponderosa Pine (Figure II–2)



PONDEROSA PINE

FIGURE II-2

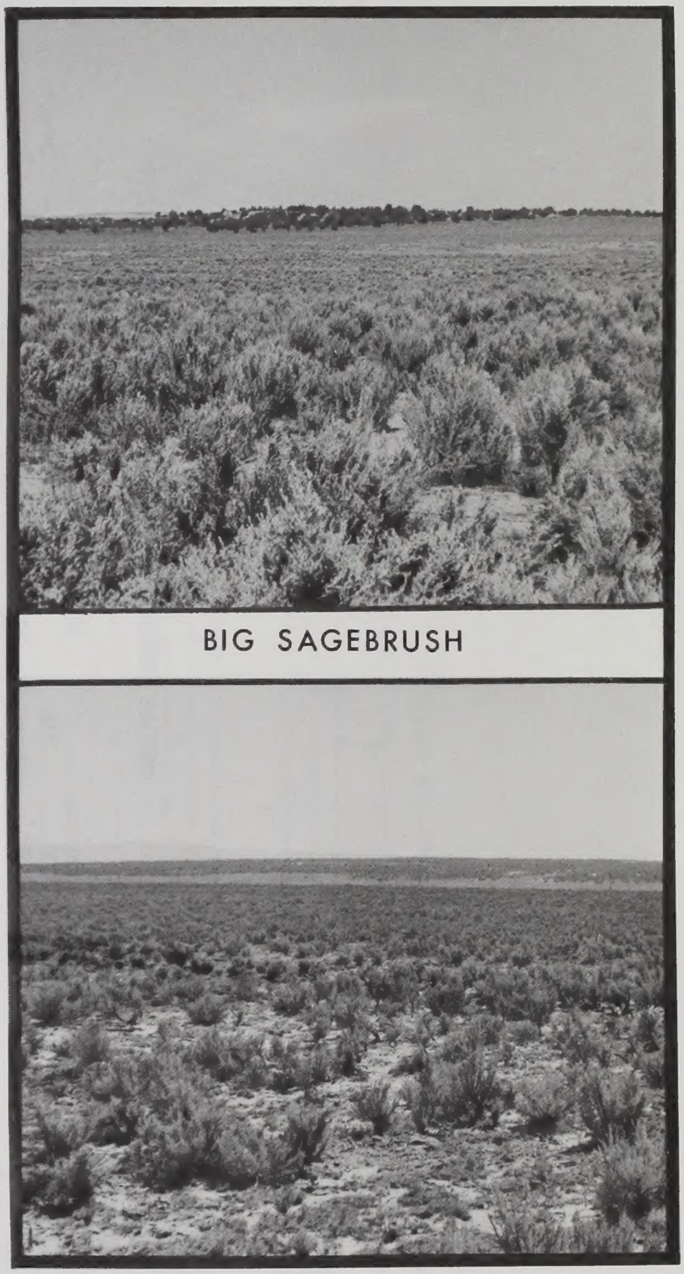
In the Rio Puerco ES Area the ponderosa pine vegetative sub-type occurs in small scattered stands at the higher elevations which receive the most precipitation in the area. These stands occur at about 8,000 feet above sea level near the Continental Divide in the north and on Mesa Chivato in the southwestern part of the area. They are most typical where the ponderosa pine sub-type meets the pinyon-juniper sub-type and many species are common to both sub-types.

The ponderosa pine sub-type is one of the smallest in area, covering approximately 9,000 acres. It is less than two percent of the total vegetative sub-types in the Rio Puerco ES Area.

Shrub Vegetative Sub-types

The area contains a number of shrub vegetative sub-types including big sagebrush, four-wing saltbush and greasewood. The location and extent of these sub-types are influenced by soil characteristics and precipitation. Big sagebrush occurs in

Big Sagebrush (Figure II–3)



BIG SAGEBRUSH

FIGURE II-3

areas with nine inches or more annual precipitation. Four-wing saltbush and greasewood generally occupy sites with the highest mineral salt content in the soils found in the area. Four-wing saltbush also occupies sites which are drier than either big sagebrush or greasewood tolerate.

The big sagebrush sub-type ranks third in the total acreage occupied by vegetative sub-types in the Rio Puerco ES Area, occupying approximately 95,000 acres. This type has been subdivided into treated and untreated areas. Treated big sagebrush areas have been converted to a grass aspect through vegetative manipulation. There are approximately 55,400 acres of untreated and 39,600 acres of treated big sagebrush. The total acreage represents approximately nineteen percent of the area.

Four-wing Saltbush (Figure II–4)

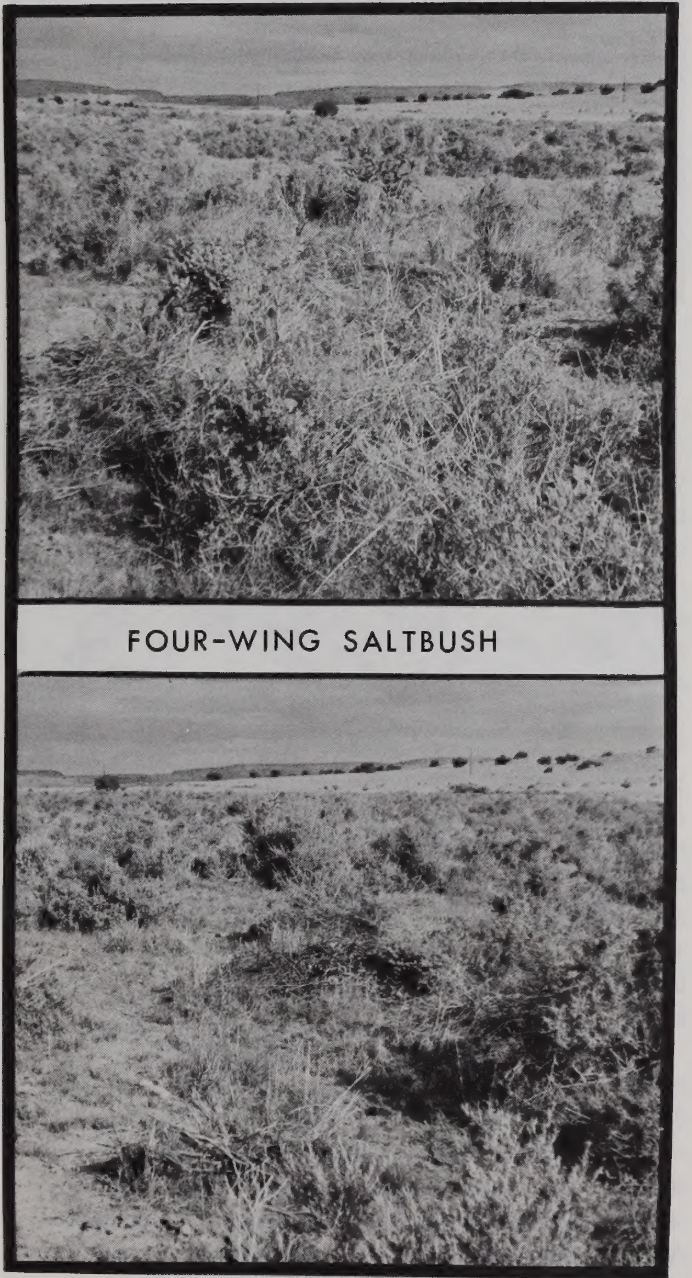

FOUR-WING SALTBUSH

FIGURE II-4

Although the type is dominated by big sagebrush, small stands of black sagebrush, silver sage and sand sage also occur. Black sagebrush may be locally important since the species receives more use by cattle and wildlife during the fall and winter than big sagebrush. Sand sage is relatively unimportant due to limited quantities. Silver sage is present in very limited amounts.

Vegetative manipulation on big sagebrush was done to reduce big sagebrush population and improve watershed conditions. Big sagebrush was treated primarily by mechanical methods of three types: marden brushcutting, rotary brushcutting and chaining. Broadcast seeding was included in the marden brushcutting and resulted in adding the cool season species, crested wheatgrass, to what had been a composition of mostly warm season grass species. A limited amount (approximately 800 acres) of chemical control (2-4D) has been done.

The four-wing saltbush vegetative sub-type occupies approximately 18,000 acres (about 4 percent) of the ES Area. It is most common in the valley bottoms which have saline or alkaline soils. The sub-type includes small areas on which shadscale and nutall saltbush are the dominant plants; but, since these areas are small, the acreage is included with the four-wing saltbush sub-type. The four-wing saltbush sub-type is the most productive per acre of all the vegetative sub-types in the area.

The greasewood vegetative sub-type occupies approximately 9,000 acres, or about two percent of the total ES Area. This sub-type is found where the soils are alkaline and often where the long tap-root of the species can contact shallow ground water tables. The typical site is in narrow bands adjacent to the arroyo of the Rio Puerco or other drainage bottoms in heavy alkaline soils.

Shortgrass, as found in the area, has almost equal amounts of blue grama, galleta and alkali sacaton, but each may dominate specific sites, as well as mix with each other. The shortgrass vegetative sub-type is second in size of vegetative types and occupies approximately 150,000 acres, *Greasewood* (*Figure II–5*)

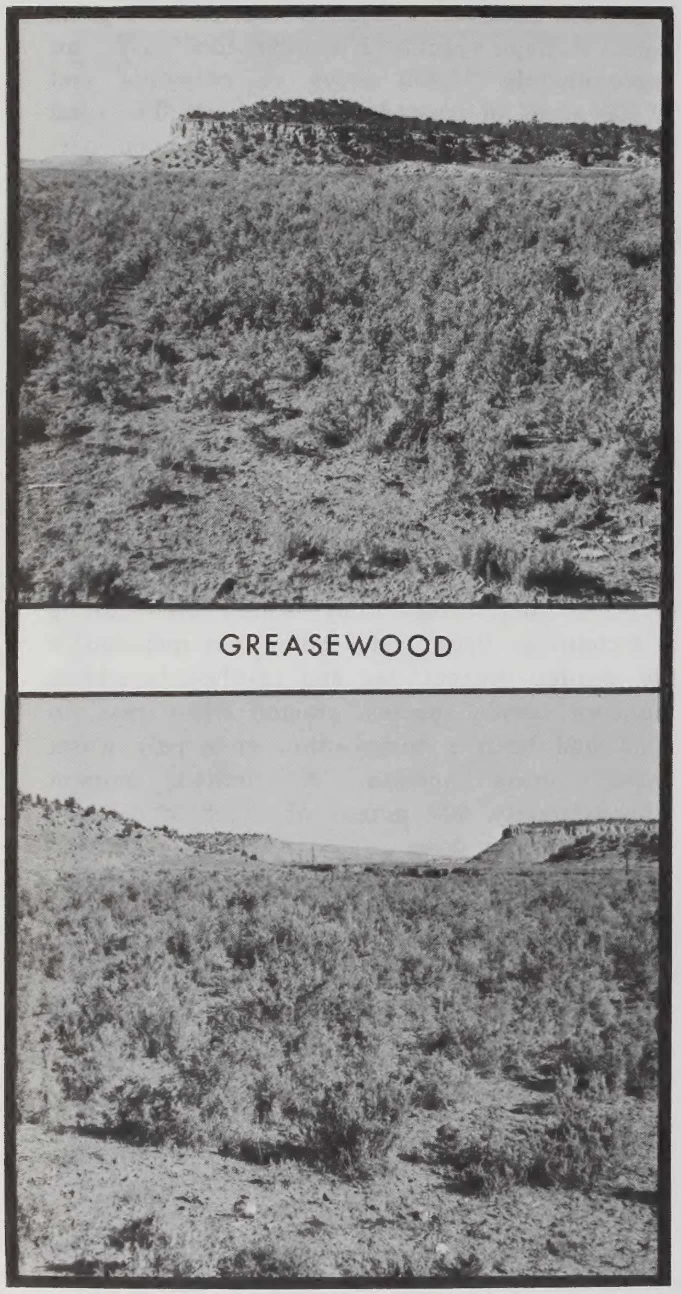


FIGURE 11-5

or 30 percent of the area. It is primarily located in the south and southeast.

The shortgrass vegetative type also has a significant acreage which has received vegetative manipulation. About 7,000 acres in the area were treated by deep soil ripping. This practice was done to improve watershed erosion conditions by making a physical barrier, which would trap surface runoff, allowing it to infiltrate and increase vegetative cover.

Shortgrass (*Figure II–6*)

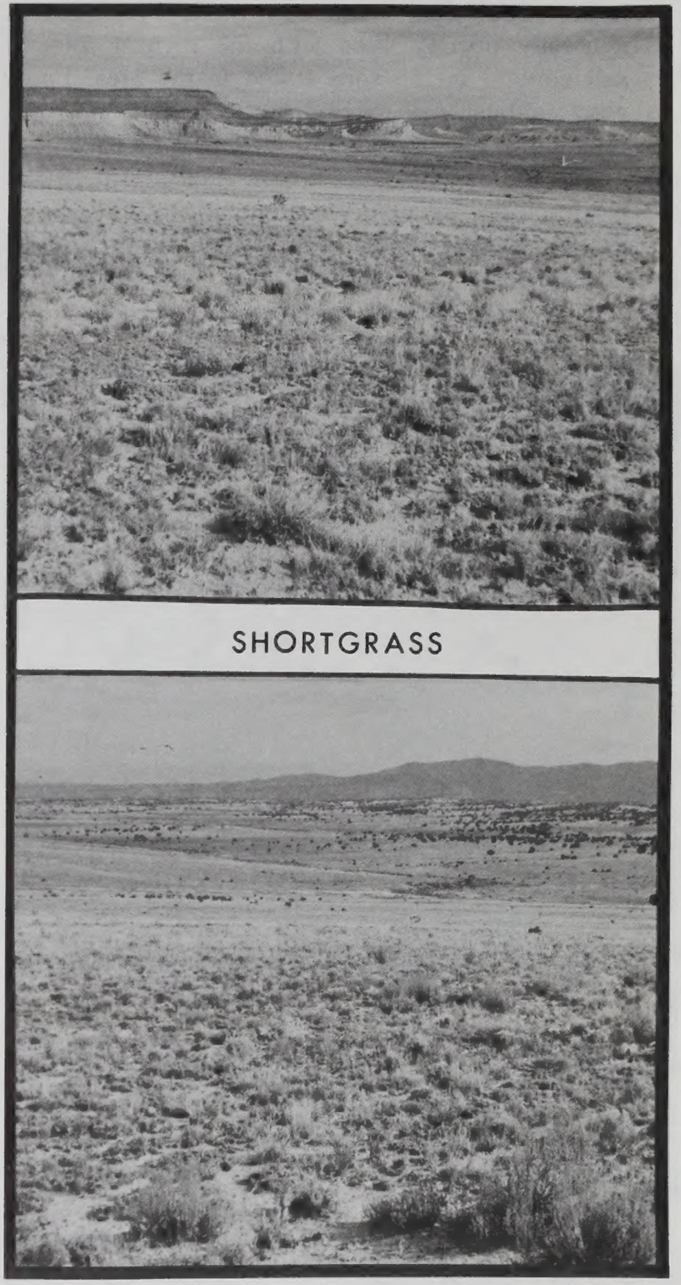


FIGURE II-6

The areas which received treatment were in very poor condition and had active erosion problems. The shortgrass vegetative type is the most important type in terms of total vegetative production in the Rio Puerco ES Area.

Broom snakeweed, as found in the area, is actually deteriorated shortgrass where broom snakeweed has invaded and become established as the aspect and dominant species. The type occurs on approximately 15,000 acres, or three percent, of the total area.

Broom Snakeweed (Figure II–7)

BROOM SNAKEWEED

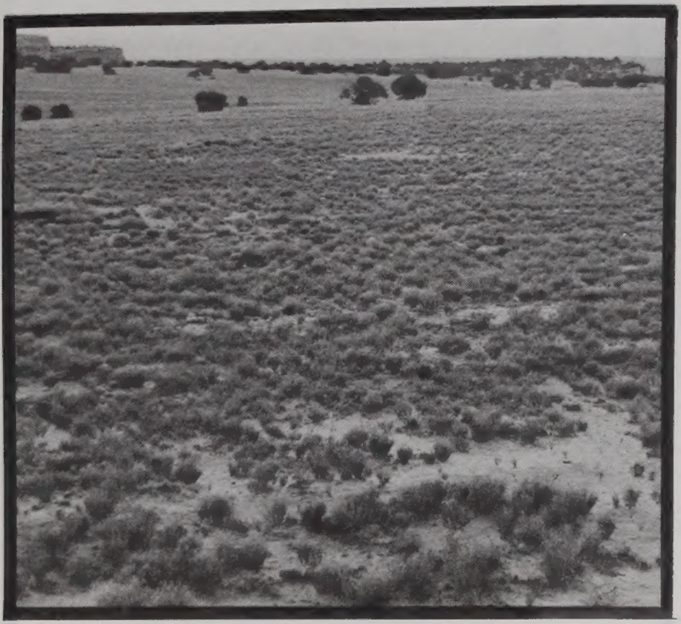
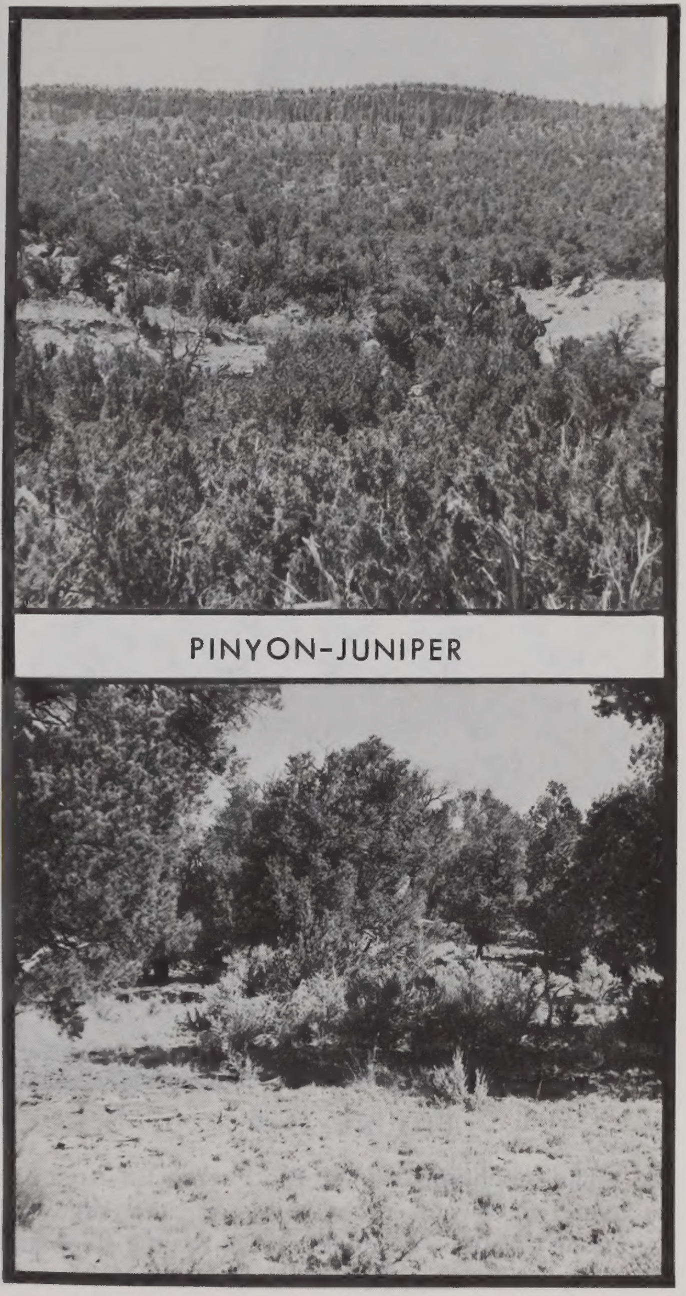


FIGURE II-7

Pinyon-juniper (Figure II–8)



PINYON-JUNIPER

FIGURE II-8

Pinyon-juniper covers the largest area of all vegetative sub-types in the Rio Puerco ES Area with a total of 181,000 acres, or approximately 37 percent of the area. The sub-type is scattered over most of the area and occurs on all soil associations except Christianburg-Navajo. Pinyon-juniper cannot tolerate the strongly saline and alkali soils of this association. Typically, the pinyon-juniper vegetative sub-type is found on mesas, outcrops, breaks, ridges and rolling hills. Stands of these dwarf conifers vary in size of trees and population densities according to the amount of precipitation and elevations above sea level, as well as soil characteristics. Composition also varies with juniper being common on the more arid sites and pinyon more common in those sites receiving the most precipitation. In some areas, the vegetative sub-type could be described as open woodland. In other areas the stands present a closed canopy of trees.

The pinyon-juniper sub-type has had vegetative manipulation by chaining on approximately 16,000 acres. The chaining was to remove pinyon-juniper. The earliest projects depended on response from native grass and shrub species for revegetation, while later projects included reseeding with grass, forb and brush species for wildlife habitat development or watershed improvement. The bulk of the treatment projects were completed to improve watershed conditions. Big sagebrush appears to have increased in numbers in pinyon-juniper treated areas as a result of the treatment.

The variety of soils and topography on sites occupied by this species result in a wide range of vegetative and soil erosion conditions. The erosion condition class change from moderate to slight was caused by both the increase in low growing vegetation and litter.

Steep and Rocky (Figure II–9)

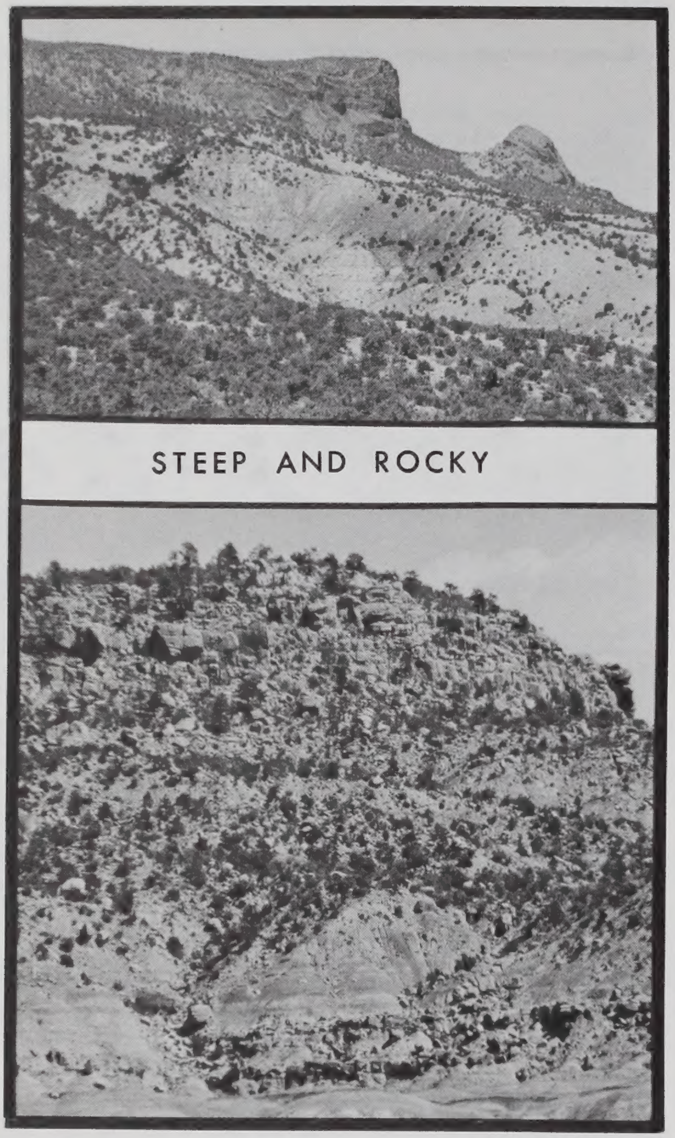


FIGURE II-9

The topography of the Rio Puerco ES Area has many steep and rocky areas on the edges of mesas or hills. The total acreage for the steep and rocky areas is approximately 10,000 acres, or two percent, of the area. Generally, slopes of 30 to 60 percent are present and this topography is conducive to high erosion. The sub-type does not produce appreciable vegetation but is important because of its size and use by wildlife.

Barren (Figure II–10)

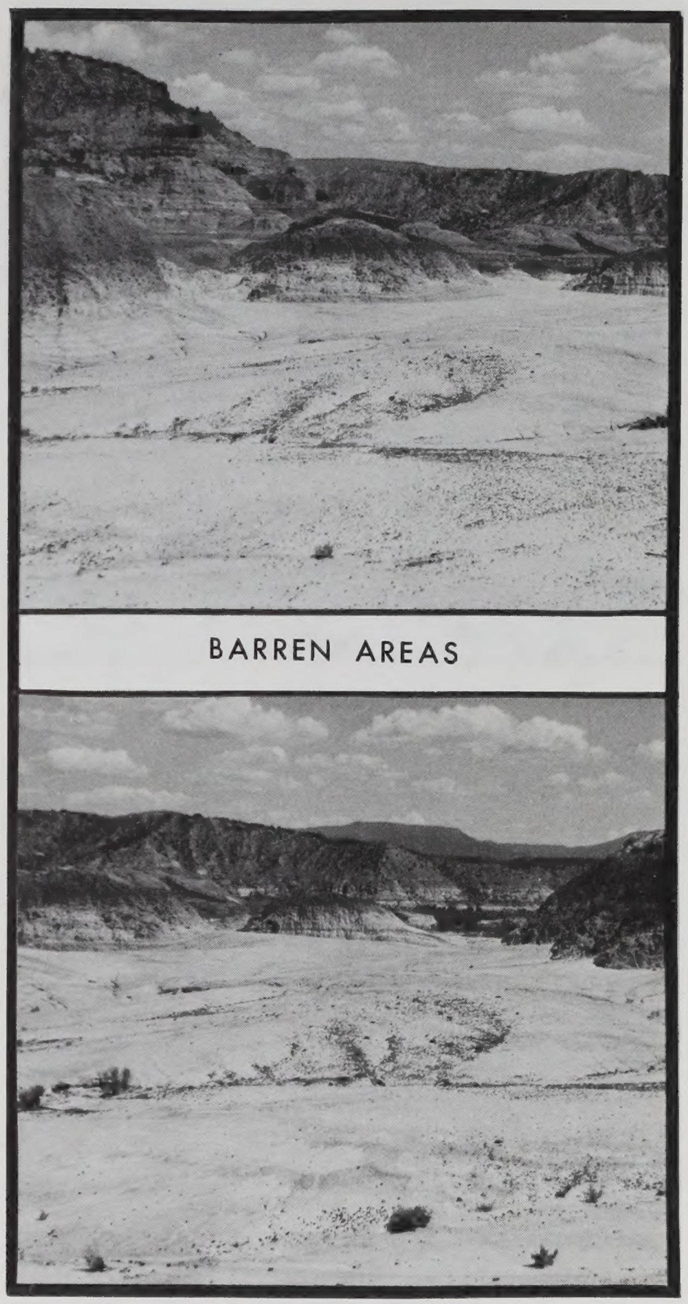


FIGURE II-10

The Rio Puerco ES Area contains approximately 4,000 acres (less than one percent) classified as barren. The distinguishing characteristic is the low amount of vegetation and active natural erosion. Areas may be exposed sandstone but most frequently are exposed shale beds, the so-called badland aspect. The erosion condition class is severe.

Forage Production By Vegetative Sub-type

Table II-8 lists the acreage for AMP and Non-AMP areas found in each vegetative sub-type. The table also lists the estimated current (1975) average forage production using the methodology described in Appendix I-1.

Poisonous Plants

A number of poisonous plants are found in the

Table II-8

ESTIMATED PRESENT FORAGE PRODUCTION BY VEGETATIVE SUB-TYPE

ES AREA ACREAGE[1]

Allotments Presently Having AMPs

Vegetative Sub-Types	Acres	Production In AUMs[2]
Ponderosa pine	7,738	1,081
Big sagebrush	58,805	10,377
Four-wing saltbush	5,405	278
Greasewood	1,686	153
Shortgrass	32,530	5,993
Broom snakeweed	3,521	65
Pinyon-juniper	76,531	7,480
Steep and Rocky	2,634	133
Barren	2,463	14
TOTAL	191,313	25,574

Allotments Presently Without AMPs

Vegetative Sub-Types	Acres	Production In AUMs[2]
Ponderosa pine	900	105
Big sagebrush	36,340	5,739
Four-wing saltbush	13,023	3,866
Greasewood	7,288	900
Shortgrass	117,596	18,647
Broom snakeweed	11,172	1,905
Pinyon-juniper	105,185	12,442
Steep and Rocky	7,802	255
Barren	1,401	13
TOTAL	300,707	43,872

ES Area Total Acres	492,020	69,446
(43 acres cropland)	43	
	492,063	

---

[1] Acres and AUMs projected for public lands and all other lands used in conjunction with these public lands.

[2] AUMs estimated at 50% level of utilization of key forage species for grazing animals.

Source: 1975 BLM Resource Inventory
San Luis Watershed Study, Rocky Mountain Forest and Range Experiment Station, Albuquerque Branch
Range Plant and Range Ecosystem Data, Texas Tech University
New Mexico State University

area. Table II-9 lists these plants and the season during which they are toxic. Livestock losses have been reported as a result of the poisonous effects of larkspur, broom snakeweed, tansy mustard and yellow clover. Abundance and location vary yearly according to favorable climatic conditions for each species. Other species have not been reported as causing losses, but they are present in the area and a potential danger exists.

Threatened and Endangered Plant Species

The Endangered Species Act of 1973 establishes two categories of species subject to Federal Protection: endangered and threatened. Subsequent to this act, the Secretary of the Smithsonian Institute issued a report to Congress listing candidate endangered and threatened plant species of the U.S. This candidate list was then published in the Federal Register, on July 1, 1975 This list was refined and published in the Federal Register on June 16, 1976. Appendix II-1 compares the 1975 and 1976 lists. The taxa enumerated for New Mexico on this list were the basis of a study of the Rio Puerco ES Area performed by Dr. W. C. Martin and Associates during the last half of 1975.

Only the two categories, endangered species and threatened species, are written into law. The investigators for the study felt it necessary to add two additional categories to those initially provided, giving a total of four categories. The classifications endangered populations and taxa with restricted range were added.

Originally, seven species from the Smithsonian list were selected as possibly occurring in the Rio Puerco ES Area (see Table II-10). The additional categories, which the study team felt were necessary, resulted in an expanded list of species (see Table II-11).

The annotated lists, developed during a relatively short period of time, can be expanded in the future. It should be emphasized that there has been no requirement to search for information on these species, previous to the Act. Thus, the state of knowledge not only lacks a complete search for habitats, but virtually nothing is known of the requirements for these species to live and reproduce. Table II-12 lists the threatened and endangered plants collected in the area.

Range Condition

Present range condition based on 1975 BLM Resource Inventory is found in Chapter III where it is compared to the proposed action.

Wildlife

The Rio Puerco ES Area provides food and cover for numerous species of wildlife. Some animals are associated with a particular plant community or vegetative type, while others are more wide ranging. Limited water resources along with grazing excesses have restricted habitat development of many species. Supplementary Reference II-4 in the Albuquerque District Office is a listing of wildlife species found in the area.

Large Mammals

Five species of large mammals (elk, mule deer, pronghorn antelope, black bear, mountain lion) occurring within the area are also classified as big game. Harvest statistics for big game are included in the Recreation section. The large grazing mammals (elk, mule deer and pronghorn antelope) each have specific grazing preferences and normally eat certain species of plants that are seldom used by the other wildlife. Some plants are also more palatable, more abundant, or more nutritious at different seasons.

Dietary Overlap

Forage competition between livestock and big game varies by season, location and species because of related differences in feeding habits and management practices. In the winter and early spring, deer and elk feed primarily on mountain mahogany, sagebrush, pinyon, juniper, and to a lesser extent various grasses and forbs. Direct competition with livestock is normally lowest during these seasons. However, heavy use by livestock in areas containing winter browse reduces food availability and directly increases competition. As new growth increases the availability of grasses, forbs and other forms of green forage, the food habits of these species change and competition with livestock increases. Competition between elk and livestock is usually greatest in mid-August, when the dietary overlap peaks at approximately 50 percent. Competition between elk and deer, and deer and cattle is also greatest during this period. Antelope, on the other hand, compete least with livestock during the summer period, and most during the winter season. Winter and early spring antelope foods include sagebrush, four-wing saltbush and various other forms of browse. They also consume more grass during these seasons than during other periods. In the summer, when new herbaceous vegetation is available, antelope diets consist

Table II-9

POISONOUS PLANTS FOUND IN THE RIO PUERCO ES AREA

Common Name	Scientific Name	Season of Toxicity
Arrow Grass	Triglochin maritima	Year Round
Cocklebur	Xanthium spp.	Spring
Greasewood	Sarcobatus vermiculatus	Spring
Grounsel	Senecio spp.	Year Round
Horsebrush	Tetradymia canescens	Spring
Juniper	Juniperus monosperma	Year Round
Lambsquarter	Chenopodium album	Spring
Larkspur	Delphinium spp.	Spring and Early Summer
Locoweed	Astragalus spp.	Spring
Milkweed	Asclepias spp.	Year Round
Mountain Mahogany	Cercocarpus montanus	Fall
Oak Species	Quercus spp.	Spring
Pingue Rubberweed	Hymenoxys richardsonii	Spring and Fall
Pinyon Pine	Pinus edulis	Year Round
Prince's Plume	Stanleya pinnata	Summer
Russian Thistle	Salsola kali	Spring and Summer
Broom Snakeweed	Gutierrezia sarothrae	Late Winter and Spring
Tansy Mustard	Descurainia pinnata	Spring
Yellow Clover	Trifolium procumbens	Spring

Source: BLM - Albuquerque District Office Records

Table II-10

SEVEN THREATENED AND ENDANGERED VEGETATIVE SPECIES SELECTED AS POSSIBLY OCCURRING IN THE RIO PUERCO ES AREA*

Scientific Name	Description
Erigeron rhizomatus Cronq.	Retained as an endangered taxa, possibly occurring within the Rio Puerco ES Area
Pediocactus papyraconthus L. Benson	Retained as a threatened taxa, possibly occurring within the Rio Puerco ES Area
Puccinellia parshii Hitchc.	Reclassified to endangered population status, possibly occurring within the Rio Puerco ES Area
Coryphantha sneedii (Britt and Rose) Berger	Range is Southeastern New Mexico, should not occur within the Rio Puerco ES Area
Sclerocactus mesae-verdae (Baiss) L. Benson	Range is extreme Northwestern New Mexico, should not occur within the Rio Puerco ES Area
Phacelia intergrifolia Torr, var. texana	Description has not been found, P. intergrifolia Torr is widespread and common
Erigonum densum Greene	Kearney and Peebles list this species as very common, having a range that extends through Utah, Nevada, Arizona, and New Mexico

*At present, these vegetative species are candidates for the threatened and endangered species list.

Source: Federal Register, Volume 40, No. 127 - Tuesday, July 1, 1975
W. C. Martin, 1975

Table II-11

EXPANDED LIST OF THREATENED AND ENDANGERED PLANT SPECIES WHICH MAY OCCUR IN THE RIO PUERCO ES AREA*

Rank	Species	Family
En	Abronia bigelovii Heimerl	Nyctaginaceae
RR	Asclepias macrosperma Eastw.	Asclepiadaceae
RR	Astragalus albulus Woot. & Standl.	Leguminosae (Fabaceae)
RR	Astragalus coltonii Jones var. moabensis Jones	Leguminosae (Fabaceae)
En	Astragalus cyaneus Gray	Leguminosae (Fabaceae)
RR	Astragalus iodopetalous (Rydb.) Barneby	Leguminosae (Fabaceae)
Th	Astragalus kentrophyta Gray var. neomexicanus (Barneby) Barneby	Leguminosae (Fabaceae)
En	Astragalus micromeris Barneby	Leguminosae (Fabaceae)
Th	Carex pityophylla Mack.	Cyperaceae
RR	Cirsium calcareum (Jones) W. & St.	Compositae (Asteraceae)
EnP	Coryphantha missouriensis (Sw.) Britt & Rose	Cactaceae
Th	Dicoria paniculata Eastw.	Compositae (Asteraceae)
En	Erigeron rhizomatus Cronq.	Compositae (Asteraceae)
RR	Eriogonum scoparium Small	Polygonaceae
RR	Eriogonum subreniforme Wats.	Polygonaceae
RR	Eriogonum tristichum Small	Polygonaceae
RR	Gilia formosa Greene	Polemoniaceae

En = Endangered taxa
EnP = Endangered population
Th = Threatened taxa
RR = Taxa with restricted ranges

Table II-11 (continued)

Rank	Species	Family
RR	Grindelia arizonica Gray var. stenophylla Steyerm.	Compositae (Asteraceae)
RR	Helianthella microcephala Gray	Compositae (Asteraceae)
RR	Muhlenbergia thurberi Rydb.	Gramincae (Poaceae)
RR	Opuntia polyancantha Haw. var. juniperina (Engelm.) L. Benson	Cactaceae
Th	Pediocactus papyrancanthus (Engelm.) L. Benson	Cactaceae
RR	Penstemon crandallii A. Nels. subsp. glabrescens (Pennell) Keck	Scrophulariaceae
RR	Penstemon linarioides Gray subsp. Coloradensis (A. Nels.) Keck	Scrophulariaceae
En	Phlox caryophylla Wherry	Polemoniaceae
Th	Psoralea megalantha W. & St.	Leguminosae
EnP	Pucinellia parishii Hitchc.	Gramineae (Poaceae)
EnP	Salicornia rubra A. Nels.	Chenopodiaceae
Th	Sisymbrium aureum (Eastw.) Payson	Cruciferae (Brassicaceae)
RR	Solidago graminea (W. & St.) Blake	Compositae (Asteraceae)
Th	Talinum brevifolium Torr.	Portalacaceae
EnP	Triglochin maritimia L.	Juncaginaceae
Th	Wyethia scabra Hook. var. canescens W. A. Weber	Compositae (Asteraceae)

*At present, the species listed as threatened and endangered are only candidates for the list as published in the Federal Register, Volume 40, Number 227, July 1, 1975.

En = Endangered taxa
EnP = Endangered population
Th = Threatened taxa
RR = Taxa with restricted ranges

Source: W. C. Martin, 1975

Table II-12

ENDANGERED/THREATENED PLANTS COLLECTED*

Rio Puerco ES Area

Endangered Species	Abronia bigelovii Heimerl
Threatened Species	Astragalus kenotrophyta var. neomexicanus (Barneby) Barneby (Also, Targetarius var. neomexicanus Barneby) Wyethia scabra Hook. var. canescens W.A. Weber
Endangered Populations	Corphantha missouriensis (SW.) Britt and Rose (Also, Neobessya missouriensis (SW.) Britt and Rose) Salicornia rubra A. Nels. Triglochin maritima L.

*At present, the species listed as threatened and endangered are only candidates for the list as published in the Federal Register, Volume 40, Number 227, July 1, 1975.

Source: BLM Albuquerque District Office Reports primarily of forbs, while cattle prefer grass. The estimated percentage of diet overlap between deer, elk, antelope and cattle, for the various seasons of use, is depicted on Figure II-11.

Elk

Elk occur in the area yearlong but their range is limited to the Ignacio Chavez Grant, the western slopes of the Nacimiento Mountains and La Ventana Mesa (see Map II-3). The Ignacio Chavez Grant provides both summer and winter elk range, although the populations present during these periods differ in size as well as in areas of use. Summer range is generally limited to 11,500 acres located at the top of Mesa Chivato. This habitat supports the area's only permanent elk herd of about 15 to 20 animals. While it is normally considered summer range, Mesa Chivato may occasionally be occupied during mild winters. During normal winters, however, elk shift use to the mesa edges and woodlands on the northern and eastern portions of the Ignacio Chavez Grant and their population increases to about 60 to 80 (Raught, personal communication, 1976). This increase comes from animals migrating from higher elevations on Mt Taylor. The mesa edges and woodlands of the northern and eastern portions of Ignacio Chavez Grant are considered critical winter areas for elk as a result of their habitual use and high concentration into a fraction of the total range. The condition of these areas directly affects the total number of animals able to utilize the larger areas of spring and summer ranges.

Of the approximately 11,500 acres considered critical winter habitat in the proposed Ignacio Chavez and El Banquito allotments, 230 acres (two percent) are classified as being in poor condition, 4,255 (37 percent) are classified as being in fair condition, and 7,015 (61 percent) are classified as being in good condition.

Elk use of the area is limited by inadequate water supply especially during summer months when water sources are restricted to the Ned and Seco dirt tanks and Toruno Spring. General population trends indicate a possible expansion of the present elk herd, attributable to the past pinyon-juniper treatments and the increase in grasses, particularly crested wheatgrass (personal communication with Gerald Gates, New Mexico Department of Game and Fish). The location of calving grounds in these areas is presently unknown.

Elk use of the La Ventana area is confined to winter occupation only. Approximately 6,200 acres of public lands along the mesas and foothills east of Highway 44 is critical winter elk habitat for herds of the Nacimiento Mountains. These lands support a winter population of 50 to 60 animals during normal years. Compared with earlier BLM records of the area, recent observations indicate that winter densities are increasing.

Of the approximately 6,200 acres considered critical winter habitat in the proposed San Pablo, Elk Spring and Coal Creek allotments, only 2,850 acres (14 percent) are in good condition, with 2,870 acres (46 percent) in fair condition, and 2,480 acres (40 percent) in poor condition.

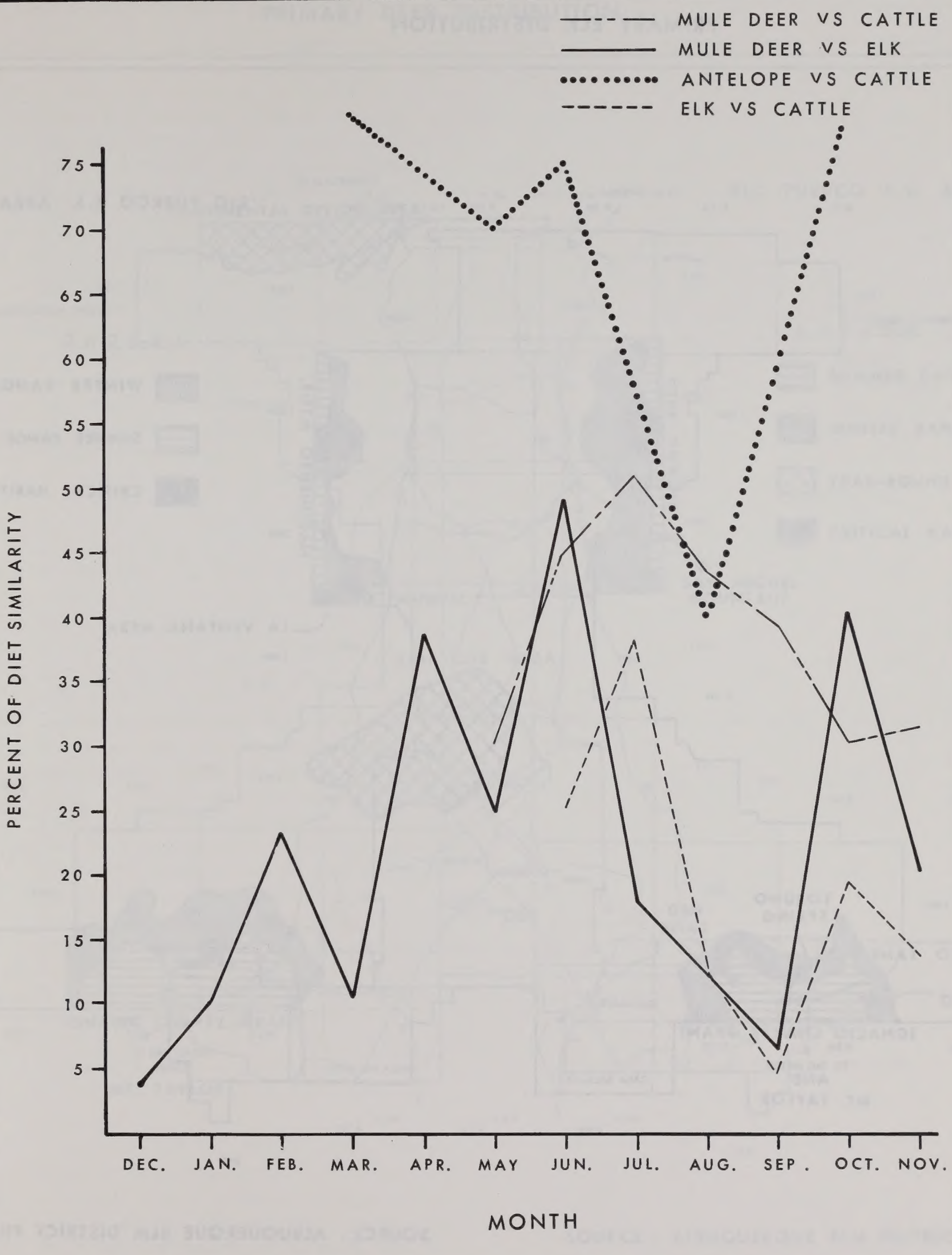
The high percentage of area in poor condition results from concentration of big game along with a past livestock overuse of cool season grasses and palatable browse. The reduction of pinyon-juniper through chaining of approximately 320 acres and agricultural practices on adjacent private lands have increased elk use of the La Ventana range.

The livestock use of customary elk winter ranges has resulted in competition, and subsequent overuse of grasses and browse species throughout most of the area. Use has been intensified in the few areas of available waters, i.e., Elk Springs and foothills of the proposed San Pablo allotment.

Deer

Because they are widely distributed throughout the area and are present in the greatest numbers, mule deer are the most important big game species of the ES Area. Although they are scattered, and occupy various habitats, heaviest concentrations occur on the Ignacio Chavez Grant, the La Ventana area, along the Continental Divide area (west of Cuba) and on Mesa San Luis (see Map II-4). These and other areas support about 750 deer throughout the year and about 1,150 deer during the winter. The distribution and status of deer and their habitat is shown on Table II-13. Definitions of habitat conditions are shown in Appendix II-2.

The La Ventana, Ignacio Chavez and Continental Divide areas are considered critical winter deer habitat, because of the restricted area available to support the concentrations of deer which migrate from the summer ranges. The habitat condition of these areas largely determine the herd numbers which are able to occupy the adjacent spring and summer ranges, and as such, constitute a limiting factor for deer herds which depend upon these relatively small areas during the winter months. The density, vigor and productivity of 78 percent

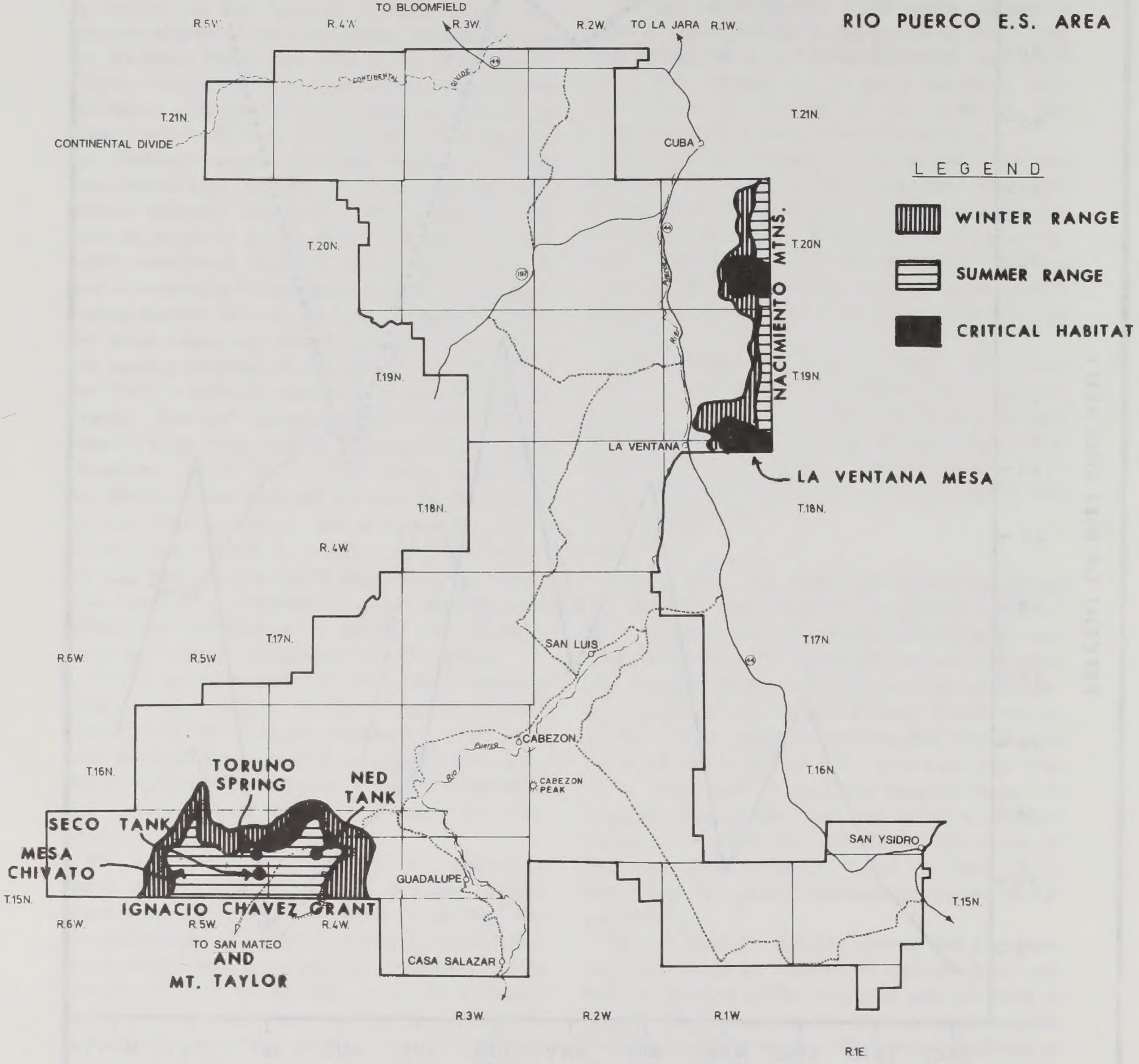


ESTIMATED PERCENTAGE DIET OVERLAP FOR DEER, ELK, ANTELOPE AND CATTLE

SOURCE: HANSEN AND REICH, 1975
SCHWARTZ AND NAGY, 1976

FIGURE II-11

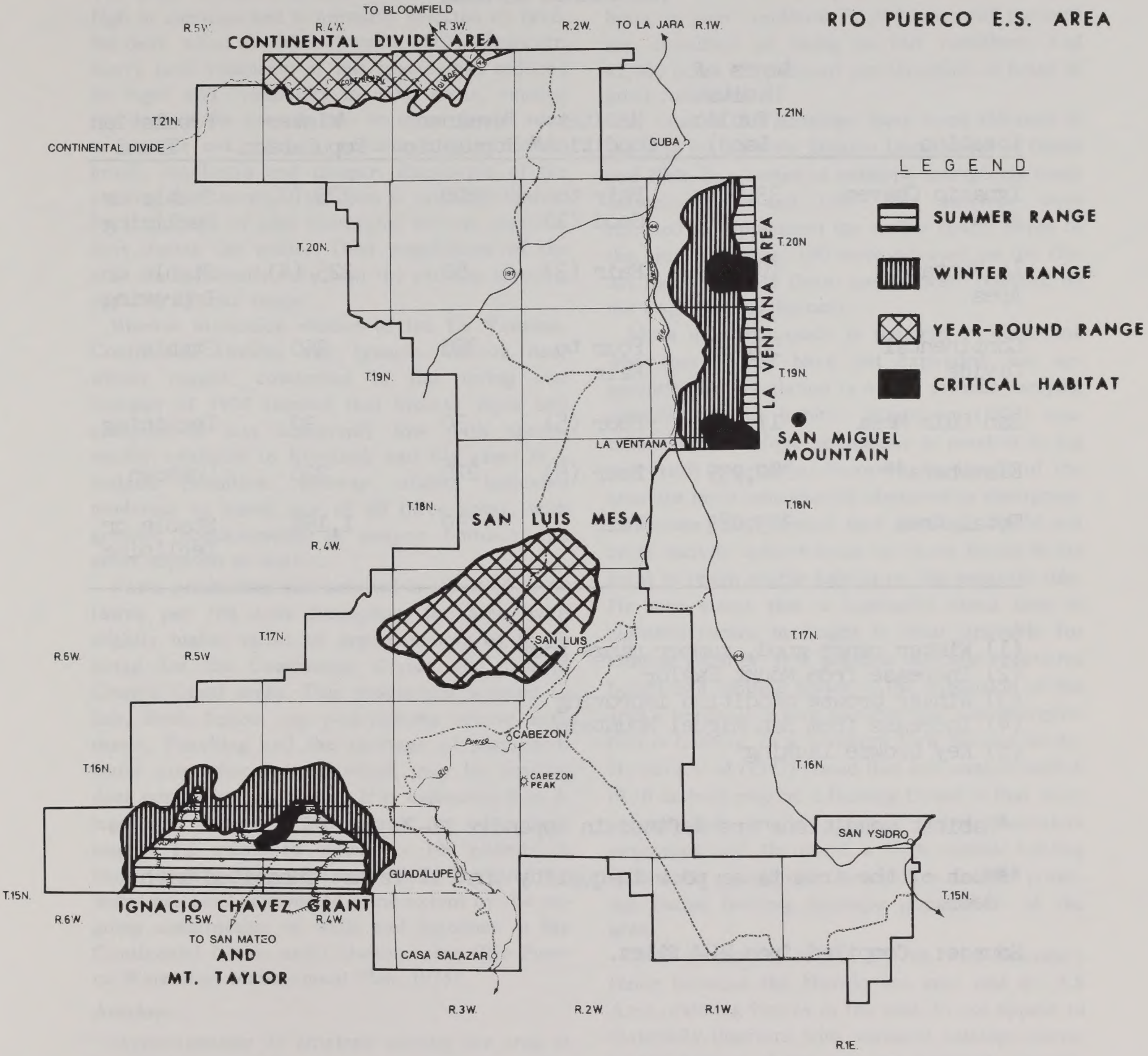
PRIMARY ELK DISTRIBUTION



SOURCE: ALBUQUERQUE BLM DISTRICT FILES

MAP II-3

PRIMARY DEER DISTRIBUTION



SOURCE: ALBUQUERQUE BLM DISTRICT FILES

MAP II-4

Table II-13

MULE DEER HABITAT AND DISTRIBUTION

RIO PUERCO ES AREA

Location	Acres of Habitat (Public Land)	Habitat Condition*	Permanent Population	Winter Population	Population Trend
Ignacio Chavez Area	33,584	Fair to Good (1)	100	325 (2)	Stable or Declining
La Ventana Area	10,840	Fair (3)	50	225 (4)	Stable or Improving
Continental Divide	50,440	Poor to Fair	350	350	Stable
San Luis Mesa	17,280	Poor (5)	30	30	Declining
Elsewhere**	280,939	Poor (5)	220	220	Unknown
Total Area	393,083	Fair	750	1,150	Stable or Declining

(1) Winter range good, summer range poor
(2) Increase from Mount Taylor
(3) Winter browse condition improving
(4) Increase from San Miguel Mountain
(5) Key browse lacking

*Habitat conditions are defined in Appendix II-2

**Much of the area is so poor in quality that it is not inhabited with deer.

Source: Compiled from BLM files.

of the deer using the area are influenced by the condition of these key winter locations.

While they may occasionally feed on grass and forbs, deer primarily browse on twigs, leaves, buds and fruit of woody plants (Stewart, 1967). The most desirable is mountain mahogany. It is high in nutrition and is normally selected by feeding deer, when available (Swank, 1965). However, heavy past utilization of this species has reduced its vigor and availability in most areas, causing the deer of the area to rely on other foods; such as gambel oak, pinyon, ponderosa pine, rabbitbrush, sagebrush and juniper. Expansion of the existing deer herds of the area is probably limited by a shortage of high nutritional browse, particularly during the winter. Deer populations of the area are apparently very near the existing carrying capacity of their range.

Browse utilization studies of the La Ventana, Continental Divide, and Ignacio Chavez deer winter ranges, conducted in the spring and summer of 1974 showed that browse vigor and composition was commonly low with shrubs readily available to livestock and big game in a hedged condition. Browse studies indicated moderate to heavy use of all three areas, with greatest concentration in canyon bottoms and areas adjacent to waters.

Fawn production and survival is about 50 to 60 fawns per 100 does throughout the area, with slightly higher ratios of approximately 65 to 70 noted for the Continental Divide and Ignacio Chavez Grant areas. This production is rated as fair. Both figures are post-hunting season estimates. Poaching and the shortage of permanent water are other factors which may be limiting deer population expansion. It is estimated that illegal deer harvest is 200 animals per year. Deer require 1.5 quarts of water per 100 pounds of body weight per day (Stewart, 1967). The need for water has been relieved to some extent by the ongoing construction of wells and pipelines in the Continental Divide and Cabezon areas (Rio Puerco Watershed Management Plan, 1975).

Antelope

Approximately 75 antelope occupy the area at lower elevations. These are distributed over the grasslands of Ojo del Espiritu Santo Grant, east of Cabezon Peak (50 head), and in the vicinity the Eagle Mesa allotment, sixteen miles southwest of Cuba (25 head). Approximately 168,000 acres in the area are classified as suitable or potentially suitable habitat (see Map II-5).

While complete studies of the 168,000 acres classified as suitable or potentially suitable yearlong antelope range are lacking, it is estimated that 50,400 acres (30 percent) are classified as being in poor condition, 75,600 acres (45 percent) are classified as being in fair condition, and 42,000 acres (25 percent) are classified as being in good condition.

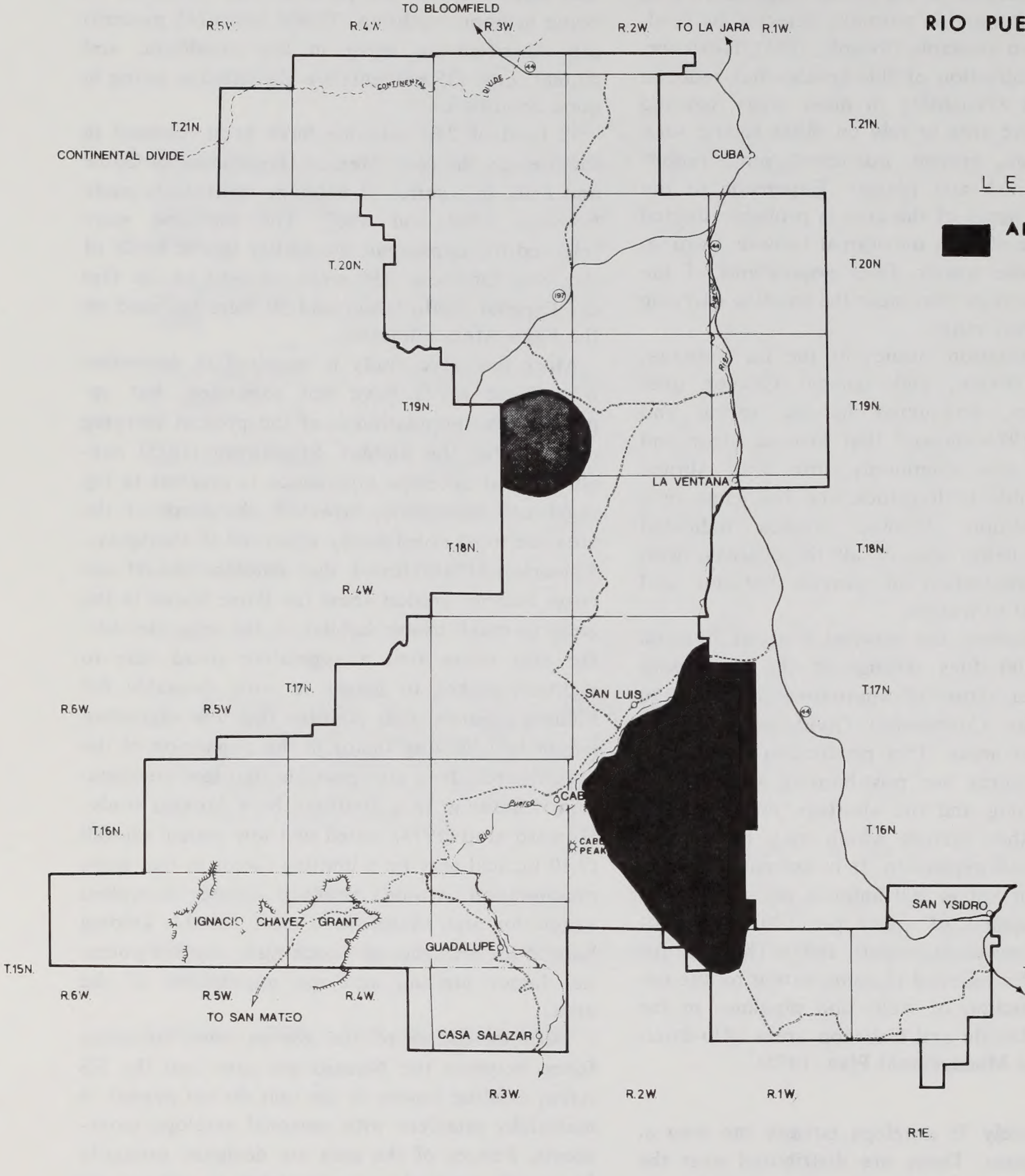
A total of 240 antelope have been released in the area by the New Mexico Department of Game and Fish, in a series of antelope transplants made between 1939 and 1967. The antelope were released to supplement the earlier sparse herds of the area. Of these, 190 were released on the Ojo del Espiritu Santo Grant and 50 were released on the Eagle Mesa allotment.

More intensive study is required to determine why these herds have not expanded, but apparently the population is at the present carrying capacity for the habitat. Sundstrom (1973) concluded that antelope abundance is greatest in big sagebrush vegetation; however, the herds of the area are most consistently observed in shortgrass. Einearsen (1948) found that antelope would not cross heavily eroded areas (as those found in the area) to reach usable habitat on the opposite side. He also states that a vegetative stand nine to eighteen inches in height is most desirable for kidding grounds. It is possible that low vegetative height is a limiting factor in the expansion of the area's herds. It is also possible that low precipitation is limiting. In a Southern New Mexico study, Howard et al (1973) stated that low annual rainfall (9.10 inches) may be a limiting factor in that more precipitation would produce more succulent vegetation and, therefore, a more suitable kidding habitat for pronghorns. Poaching is another potential factor limiting antelope populations of the area.

With exception of the woven wire boundary fence between the Navajo use area and the ES Area, existing fences in the unit do not appear to materially interfere with seasonal antelope movements. Fences of the area are designed primarily for cattle control, as contrasted to sheep use areas which require tighter fencing. The Navajo Boundary fence could constitute a major barrier to antelope movement, but antelope use of the

PRIMARY ANTELOPE DISTRIBUTION

RIO PUERCO E.S. AREA



LEGEND

■ AREA OF ANTELOPE DISTRIBUTION

SOURCE: ALBUQUERQUE BLM DISTRICT FILES

MAP II-5

area is presently very slight as a result of poor habitat conditions.

Black Bear

The mountain regions surrounding the Rio Puerco ES Area are inhabited by a small population of black bear, members of which occasionally range onto lands of the area. Bear populations are not abundant; however, probably no more than three of these animals use the area's lands as part of their range. Areas of probable use include Ignacio Chavez Grant and the western slopes of the Nacimiento Mountains.

Mountain Lion

The status of mountain lions in the area has not been recently surveyed; however, a recent sighting of mountain lion tracks (observation by BLM employee) confirms that the species does occur in the area. Since they may range 50 miles (Leopold, 1933), those occurring probably range outside the area also.

The mountain lion was common to the area in historic times, but predator control programs to protect domestic livestock and game have greatly reduced their numbers. Lions feed on large prey such as deer (Berghofer, 1967), and will turn their attention to domestic animals when natural prey becomes scarce (Bailey, 1971). The present number of this species ranging onto lands of the area is estimated to be between three and six.

Birds

Upland Game Birds

Small flocks of Merriam's turkey are occasionally observed on Mesa Chivato (see Map II-6). Potential habitat in this area is limited to about 13,400 acres, however, and observations of the species are not frequent. The number of turkeys in the ES Area is estimated to be between 50 and 75.

Turkeys are highly diversified in their feeding habits and will substitute less desirable foods when preferred foods are not available (Scott and Boeker, 1973). It is not likely, therefore, that the turkeys are limited by food quantity. The nutritional intake of the area's turkeys is unknown, however, and it is possible that food quality may be limiting. Lee and MacDonald (1967) consider dense cover for nesting and brooding an essential requirement on turkey habitat. It is possible that a scarcity of such cover may also be limiting. Other limiting factors may be the lack of permanent water near nesting, feeding and roosting sites and an abundant predator population.

Scaled quail are frequently observed on the lower elevation shortgrass near Cabezon, Casa Salazar, Guadalupe and on the Ojo del Espiritu Santo Grant. Although the known areas of quail habitation encompass nearly 90,000 acres, areas actually occupied are limited and true quail habitat is marginal. Even on ideal habitat, quail populations are subject to violent annual fluctuations (Campbell, 1967) and seasonal cycles: their annual population turnover is 70 percent. Because of the marginal condition of their habitat, quail populations are normally low, but may vary between less than one bird per section (640 acres) in dry years to as many as 30 birds per section in unusually wet years (personal communication with Howard Campbell, New Mexico Department of Game and Fish).

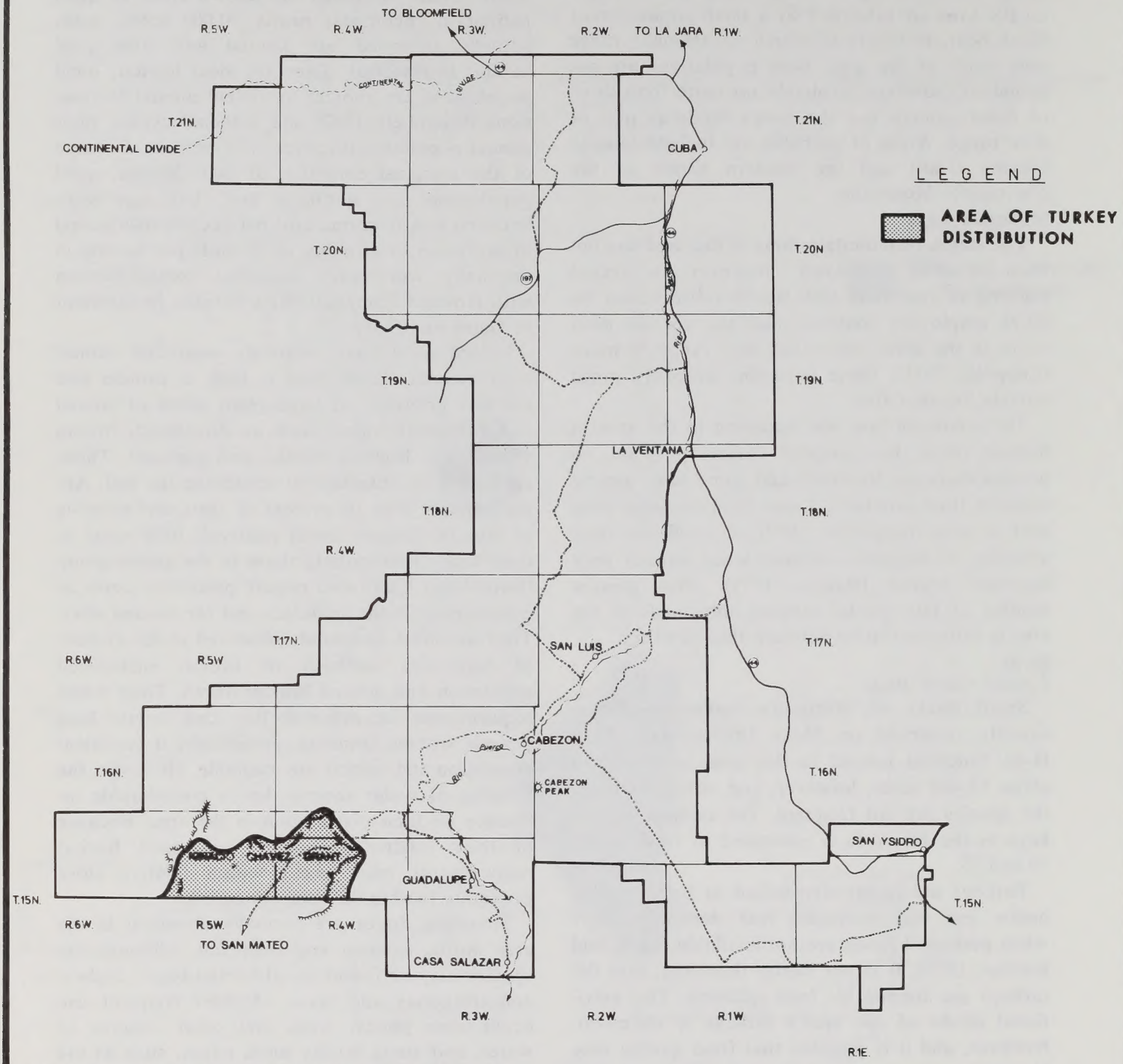
Scaled quail have relatively restricted habitat requirements. Their food is high in protein and consists primarily of large plant seeds of annual and perennial forbs, such as doveweed, broom snakeweed, Russian thistle, and pigweed. These seeds can be obtained by scratching the soil. Approximately 5 to 10 percent of their diet consists of insects. Grasses are of relatively little value as quail foods, particularly those in the grama group (Bouteloua). Quail also require protective cover as concealment from predators and for nesting sites. They are most commonly observed in the vicinity of four-wing saltbush or broom snakeweed vegetation and around brushy draws. Their water requirements are minimal: they can survive long periods without drinking, particularly if succulent vegetation and insects are available. However, the location of water sources has a considerable influence on their distribution in the area. Because of their relative immobility, all quail habitat requirements must occur within relative close proximity (within the same 40 acres).

Mourning doves are normally abundant in the area during summer and early fall. Although the species may be found on all habitat types, highest concentrations and areas of most frequent use occur near ponds, wells and other sources of water, and along brushy mesa edges, such as the eastern edge of the Ignacio Chavez Grant.

Although dove populations and habitat have not been intensively surveyed, the area appears typical to average dove habitat using standards described by Ligon (1961), and doves are frequently observed. Based on statewide dove populations, the area is probably used by more

TURKEY DISTRIBUTION

RIO PUERCO E.S. AREA



SOURCE : ALBUQUERQUE BLM DISTRICT FILES

MAP II-6

than 90,000 doves annually (calculated from Huey, 1967). This estimate includes individuals which only occasionally use the area or pass through during seasonal migrations.

Doves are considerably less restricted in their habitat requirements than quail and are capable of traveling great distances to satisfy these requirements. They are seed eaters, but are more diversified in their feeding habits; in particular, they will consume the seeds of grasses more readily. They also consume fewer insects. Doves are more dependent on drinking water and require perching sites for cooing, roosting and afternoon resting.

Eight species of ducks are reported to use the tanks and reservoirs of the area for feedings and resting during spring and fall migrations. The most common species observed (observation by BLM employee) are American widgeon and mallard. However, the number of these birds using the area and their intensity of use varies from year to year with available water. During wet years, for example, as many as 50 ducks may be observed at a single reservoir, while they may be completely absent during dry years.

Potential nesting habitat is limited in the area because of the non-permanent nature of most water systems. Reliable water is provided at the Cabezon Community Reservoir, Chiuilla Lake and Rincon Grande Tank. The former is fed by surface runoff, while the latter two ponds are fed by wells. The Rincon Grande Tank is remotely located and BLM has designated it for protection as a waterfowl habitat management area. During years of above normal precipitation additional areas have the potential of providing nesting habitat for waterfowl and may be occasionally utilized for this purpose.

Birds of Prey

Rocky cliffs and ledges along mesas and canyons of the area provide excellent nesting sites for eagles and hawks (see Seibert et al, 1976). This, combined with a diverse and relatively abundant small mammal population, makes the area productive habitat for birds of prey. Studies on prairie habitats substantiate that large raptors tend to concentrate their numbers in areas of high rodent density. The densities of rodent populations in the area would, therefore, indicate that the largest concentrations of raptors would be found in brushy and open woodland habitats (USDI, 1975), such as greasewood-four-wing saltbush and pinyon-juniper vegetative sub-types.

Other Bird Life

Birds commonly using the ES Area within the course of a normal year are listed on Table II-14. Among the bird species listed in the Supplementary Reference II-4 located in the Albuquerque District Office, 124 are birds other than game birds and birds of prey. Since they are highly mobile and commonly migratory, many of the species listed are only temporary residents.

During a recent field study (USDI, 1975), a few bird species were most common to the various plant communities of the area. For example, horned larks and meadowlarks were the most common species of shortgrass, while vesper sparrows and sage thrashers were most frequently observed in mixed shrubs. Pinyon jays, townsend's solitaires and western bluebirds appear to be the most common species utilizing pinyon-juniper woodlands. This data was collected in October, however, and may only be representative of that month. The study did not reveal bird densities, and reliable data specifically applicable to the Rio Puerco ES Area is notably lacking. However, general comparisons of the data available on vegetative sub-types found in the area indicate that diversity and density of most bird species increases as vegetation becomes more stratified. The greatest number and variety of birds should, therefore, be found in the forest vegetation of the area.

Small Mammals

The Rio Puerco ES Area has a surprisingly diverse population of small mammals, which provide the food base for most of the area's carnivores. Thirty-three species are found in the area: twenty-three rodents, two rabbits, one hare, one shrew and six bats. These species are summarized in Table II-15.

Data collected in a recent field study of the area (USDI, 1975) tend to indicate that the deer mouse is the dominant rodent species and that pinyon mice and white-throated woodrat are relatively abundant. The greatest diversity of species occurs on the four-wing saltbush/greasewood and pinyon-juniper/shortgrass communities; while shortgrass prairies have the lowest diversity. Highest total populations occur on ponderosa pine and four-wing saltbush/greasewood communities. Lowest populations are found in shortgrass. A relationship between rodent populations and vegetative manipulation was also demonstrated in

Table II-14

BIRDS FOUND IN THE RIO PUERCO ES AREA*

Common Family Name	Scientific Family Name	Number of Species
Grebes	Podicipedidae	1
Herons	Ardeidae	1
Ducks	Anatidae	8
Vultures	Cathartidae	1
Hawks, harriers and eagles	Accipitridae	10
Falcons	Falconidae	4
Quail	Phasianidae	1
Turkeys	Meleagrididae	1
Rails and coots	Rallidae	3
Plovers	Charadriidae	1
Sandpipers	Scolopacidae	1
Avocets	Recurvirostridae	1
Phalaropes	Phalaropodidae	1
Pigeons and doves	Columbidae	3
Roadrunners	Cuculidae	1
Owls	Tytonidae and Strigidae	7
Goatsuckers	Caprimulgidae	2
Swifts	Apodidae	1
Hummingbirds	Trochilidae	4
Woodpeckers	Picidae	7
Flycatchers	Tryannidae	9
Larks	Alaudidae	1
Swallows	Hirundinidae	7
Jays, magpies and crows	Corvidae	6
Titmice and bushtits	Paridae	4
Nuthatches	Sittidae	2
Creepers	Cethiidae	1
Wrens	Troglodytidae	4
Mockingbirds and thrashers	Mimidae	4
Thrushes, bluebirds and solitaires	Turdidae	6
Gnatcatchers and kinglets	Sylviidae	3
Pipits	Motacillidae	1
Waxwings	Bombycillidae	1
Shrikes	Lanaiidae	1
Starlings	Sturnidae	1
Vireos	Vireonidae	2
Warblers	Parulidae	10
Weaver finches	Ploceidae	1
Meadowlarks, blackbirds and orioles	Icteridae	7
Tanagers	Thraupidae	2
Grosbeaks, finches, sparrows and buntings	Fringillidae	26

*A supplemental list of all species showing full scientific name is available in the Albuquerque District Office, BLM (Supplementary Reference II-4).

Source: BLM District List

Table II-15

SMALL MAMMALS OF THE RIO PUERCO ES AREA*

Common Name	Genus	Number of Species
Woodrat (Packrat)	Neotoma	3
White-footed Mouse	Peromyscus	5
Pocket Mouse	Perognathus	3
Harvest Mouse	Reithrodontomys	1
Grasshopper Mouse	Onychomys	1
Kangaroo Rat	Dipodomys	2
Antelope Squirrel	Ammospermophilos	1
Chipmunk	Eutamias	1
Pocket Gopher	Thomomys	1
Prairie Dog	Cynomys	1
Abert's Squirrel	Sciurus	1
Ground Squirrel	Citellus	3
Porcupine	Erethizon	1
Jackrabbit	Lepus	1
Cottontail	Sylvilagus	2
Desert Shrew	Notisorex	1
Fringed Myotis Bat	Myotis	1
Silver-haired Bat	Lasionyoteris	1
Western Pipistrell Bat	Pipistrellus	1
Hoary Bat	Lasiurus	1
Pallid Bat	Antrozous	1
Brazilian Free-tailed Bat	Tadarida	1

*A supplemental list of all species showing full scientific name is available in the Albuquerque District Office, BLM (Supplemental Reference II-4).

Source: BLM District List

the relative trapping successes of the study. This relationship is illustrated in Table II-16.

Other rodents of the area include kangaroo rats, chipmunks, ground squirrels, prairie dogs, antelope squirrels, pocket mice, harvest mice, pocket gophers and porcupines.

Two species of cottontail rabbit and one jackrabbit species are found in the area. Field studies (USDI, 1975) indicate the areas of heaviest use by these species are found in ponderosa pine and pinyon-juniper communities and that fourwing saltbush/greasewood communities are less frequently used. The areas of lowest concentrations occur on shortgrass. Differences between the species' habitat requirements, however, also influence their distribution. For example, jackrabbits are most likely to be found on shortgrass, while cottontails prefer more brushy cover (Burt and Grossenheider, 1964).

Other small mammals found in the area include the desert shrew and six species of bats. The desert shrew is mostly restricted to arid regions (Findley et al, 1975) and has been reported in the area only once. Bailey (1971) reports that a specimen was obtained in a sandy gulch at the east base of the volcanic plateau surrounding Mt. Taylor. The bats of the area are primarily insect feeders and are usually most active at night. The abundance of these species in the area is not known.

Tree squirrels are found in the mature ponderosa pine forests located east of La Ventana, west of the Cuba Mesa and on the Ignacio Chavez Grant. Their preferred range is restricted to areas where tree diameters are between ten and thirty inches (Ffolliot and Patton, 1975), and their numbers are not abundant. The species occurring in the area include tassel-eared (Abert's) squirrel and red squirrel. The former occurs on all squirrel habitat of the area, while the latter has been reported only in the Cuba Mesa area. However, the red squirrel is also believed to occur in a Douglas fir stand located in a canyon east of La Ventana (Raught, personal communication, 1976).

Furbearers

Eight species of furbearing mammals are found in the area. The status of these species is summarized on Table II-17. Because they are primarily carnivorous, the populations of furbearers of the area are closely related to the relative abundance of insects and small rodents. The principal, non-game predatory mammals of the ES Area are coyotes and bobcats. Both species are widely distributed.

Coyotes are found in all vegetative sub-types and all but the most barren terrain. Inventories compiled by the New Mexico Department of Game and Fish (Gates, personal communication, 1975) provide data which indicate that approximately 2,000 coyotes occupy the area. Additional data compiled from predator surveys in the Cabezon area (USDI—Division of Wildlife Services, 1972-1974) tend to indicate that the area's coyote population may be increasing at a rate of about 30 percent per year (three times greater than the national rate of increase). These increases can be related to an increase in rodent populations.

Bobcats, also widely distributed throughout the area, prefer steep and rocky terrain and brushy vegetation. Because of their shy disposition, they are rarely seen, although their population is estimated to be between 400 and 500.

Fur prices for both bobcats and coyotes are currently high, and consequently they are highly sought after for sport and profit.

Reptiles and Amphibians

Table II-18 lists common reptiles and amphibians occurring within the area. Field studies (USDI, 1975) have confirmed the occurrence of collared lizards, shorthorned lizards, whiptail lizards, coachwhip snakes and bullsnakes. Since these studies were made in October, however, they may be biased for that month: western diamondback and prairie rattlesnakes are known to be relatively abundant in the area during summer months. Although two species of amphibians are listed in Table II-18, habitat for all amphibians is limited to ephemeral ponds and stock tanks.

Fish

The area includes two known fish populations; but most of the waters cannot support such populations. Although the area has not been surveyed, it is not likely that naturally occurring fish populations exist (Koster, personal communication, 1976). Each year the Chiuilla Pond (one acre) is stocked with rainbow trout by the New Mexico Department of Game and Fish. The pond receives heavy fishing pressure following stocking. Conditions for natural reproduction appear to be inadequate; however, the pond can support fish

Table II-16

RODENT TRAPPING SUCCESS AND VEGETATIVE MANIPULATION ON BIG SAGEBRUSH-SHORTGRASS SITE

Vegetative Manipulation	% Trapping Success
Untreated Big Sagebrush-Shortgrass	19
Chained - Sagebrush Removed	8
Chained and Reseeded	4
Limited Brush and Tree Removal	18

Source: BLM District Files

Table II-17

FURBEARING MAMMALS

RIO PUERCO ES AREA

Species	Estimated Number*	Status	Habitat Type
Striped Skunk	5,000	Stable	1,2
Ring-tailed Cat	Unknown	Uncommon	1,7
Badger	500	Increasing	1
Raccoon	600	Stable	1,3,4,5,6
Gray Fox	1,000	Stable	2
Kit Fox	Unknown	Uncommon	1,7
Coyote	2,000	Common	1,2,3,4,5,6
Bobcat	400-500	Common	2,3,7

1 = Shortgrass

2 = Pinyon-juniper

3 = Ponderosa Pine

4 = Greasewood-four-wing saltbush

5 = Big Sagebrush

6 = Stock Tanks

7 = Rocky Areas

*Calculated from Gerald Gates (1975)

Table II-18

COMMON REPTILES AND AMPHIBIANS

Rio Puerco ES Area*

Common Name	Scientific Name
REPTILES	
Collard Lizard	Crotophytus collaris
Sagebrush Lizard	Sceloporus graciosus
Short-horned Lizard	Phrynosoma douglassi
New Mexico Whiptail Lizard	Chemidophorus neomexicanus
Many-lined Skink	Eumeces multivirgatas
Coachwhip Snake	Masticophis flagellum
Bullsnake	Pituophis melanoleucus
Western Diamondback Rattlesnake	Croatalus atrox
Prairie Rattlesnake	Croatalus viridis
AMPHIBIANS	
Tiger Salamander	Ambystoma tigrinum
Western Spadefoot Toad	Scaphiopus hammondi
Woodhouse Toad	Bufo woodhousei

*A supplemental list of all species showing full scientific name is available in the Albuquerque District Office, BLM Supplementary Reference II-4.

Source: BLM District List

throughout the year on a restocking basis. Rincon Grande Tank, a three acre pond located in the southwestern portion of the area is fed by artesian water and is capable of supporting fish. The pond has permanent water and is normally open during the winter. The Cabezon Community Reservoir (usually reliable waterfowl habitat) occasionally dries up during unusually arid years and is considered incapable of supporting permanent fish populations.

Invertebrates

The distribution, abundance and composition of invertebrate animal populations in the area has not been intensively surveyed, and data on these populations is notably lacking. However, although it is acknowledged as incomplete, a listing of the most common arthropods (insects, spiders, scorpions, ticks and centepedes) of the area is provided in Table II-19.

Vegetation plays an important role in both distribution and numbers of arthropods beyond that of providing a source of food. Vegetation height, density and composition all affect arthropod density. A number of studies have recognized the detriment or benefit to various arthropod species related to livestock grazing of differing intensities. Pepper (1955) reported that almost without exception, high population densities of grasshoppers occur in areas with excessive livestock grazing, or with a combination of heavy grazing and dry weather. Overgrazing causes many insect species to decline or disappear, but it can enable grasshoppers to increase enormously.

Studies on the International Biological Program Grassland Biome (1971) revealed consistently greater number of arthropods throughout the season in the permanently ungrazed plots. These data are consistent with those of Morris (1967) who found that most taxonomic groups he sampled were most common in areas left ungrazed for two to three years. Lightly grazed plots supported greater numbers of arthropods than did moderately or heavily grazed plots; light grazing of pastures resulted in a build-up of **Homoptera** (plant sucking insects) which was maintained throughout the season; and ants were found in smallest numbers in the heavily grazed pasture (Lavigne, et al, 1972). In addition, arthropods are known to provide food for the area's insectivores, such as kingbirds, titmice, flycatchers, grasshopper mice, bats and shrews, as well as many other birds and mammals which are not primarily insectivores.

Threatened and Endangered Species

There are no known animal species classified as endangered or threatened by U.S. Department of Interior, or State of New Mexico, inhabiting, or dependent upon habitat within the Rio Puerco ES Area. Among the mammals, reptiles and amphibians known to occur in the area, none are designated endangered. The area was systematically surveyed by the U.S. Fish and Wildlife Service (1976) to determine whether the blackfooted ferret occurs in the area. These investigators concluded that the species is not likely to be present. The blackfooted ferret is classified as endangered by the U.S. Department of Interior and New Mexico Department of Game and Fish.

Cultural Resources

Procedures Used to Identify and Evaluate Cultural Resources

Prior to the environmental statement (ES), the BLM Albuquerque District Office had a partial cultural resources inventory on field work which had been performed by the Museum of New Mexico, Eastern New Mexico University and New Mexico State University. In addition, to provide an adequate data base for this ES, BLM contracted a stratified sample survey with Eastern New Mexico University. The results of this sample survey are contained in the Class II Survey Report for the Rio Puerco ES Area in the Albuquerque District Office. The current listing of the National Register of Historic Places (Federal Register, February 10, 1976), was reviewed to determine the presence or absence of National Register properties in the Rio Puerco ES area. Consultation with the New Mexico State Historic Preservation Officer was initiated March 4, 1976 to determine the presence of other significant cultural properties.

Ethnographic Summary

The area has a known culture history of approximately 10,000 years. The cultural context is complex, involving a number of different culture groups, some of which have attempted to use or occupy the area simultaneously.

Early Hunters and Gatherers

Paleo-Indian and archaic groups have been identified as having used the area, however this

Table II-19

COMMON ARTHROPODS

RIO PUERCO ES AREA

Scientific Name	Common Name	Number of Species
Chilopoda (Class)	Centipedes	1
Arachnida (Class)	Spiders, Scorpions, Ticks and Allies	11
Insecta (Class)	Insects	
Orthoptera (Order)	Grasshoppers, Crickets and Allies	7
Hemiptera (Order)	True Bugs	3
Homoptera (Order)	Hoppers, Aphids and Allies	5
Coleoptera (Order)	Beetles	9
Lebidoptera (Order)	Butterflies and Moths	7
Diptera (Order)	Flies	6
Hymenoptera (Order)	Ants, Bees and Wasps	7

Source: BLM District Files

occupation has not been well defined. The work of Judge, 1973, and Irwin-Williams, 1973, document the evidence of this period.

Prehistoric Horticultural Groups

This period of cultural developments includes groups referred to as Basketmaker, Pueblo and Gallina. These groups have been the most intensively studied in the area; however, this work has not been reported. References for this period consist largely of unpublished papers at the Museum of New Mexico Laboratory of Anthropology and at Eastern New Mexico University Department of Anthropology.

Historic Groups

The historic period of the area begins in the early Seventeenth Century. Culture groups associated with the area since that time includes the Navajo, Pueblo, Spanish, Anglo-American and to a lesser degree, Apaches. Published material for the period includes Kuer, 1941; Widdeson, 1958; Reeve, 1957, 1958, 1959, and 1960; Brugge, 1964; Calkins, 1937; and, Rittenhouse, 1965.

Summary Description of Cultural Resources

National Register Properties

The single National Register Property in the area is Big Bead Mesa. During the analysis for this study, several additional sites were identified as warranting nomination to the National Register of Historic Places. These sites include:

Village of Cabezon (Private)
Village of San Luis (Private)
Village of Guadalupe (Private-BLM)
Casa Salazar (Private)
Gonzales Ranch (Private)
Guadalupe Pueblo Complex (BLM)
Las Milpas Pueblo (BLM)
Piedra Lumbre Archeological District (BLM)
Azabache Station (BLM)
San Luis Archaic Site (BLM)
Cabezon Peak (BLM)

The Class II survey covered 9.5 percent of the BLM administered lands within the ES Area. Based upon this survey it can be estimated that the total number of cultural properties on BLM administered lands is approximately 1,750.

The significance of cultural resources in the area was assessed from the point of view of both heritage values and potential for scientific study. Four levels of significance (S1 through S4) have been utilized to evaluate the cultural resources known in the area. Significance evaluations are based on a wide variety of considerations. S1 evaluations are assigned to properties with a clear potential for yielding highly significant scientific information or are clearly important in terms of national, state, or local cultural heritage. S1 evaluations imply eligibility to the National Register of Historic Places and management objective of long term preservation. Properties are evaluated as S2 when they are neither unique nor representative of highly significant scientific or cultural properties. They are not, in themselves, worthy of long-term preservation. Their condition may only be fair and the information content of the site is of general background utility to science which can be repeated at a large number of sites. S3 evaluations are assigned to sites whose scientific value is significant only in the context of study with other sites. Such sites usually are of limited depth and size and are usually the locus of limited activities by the originating culture group. S4 evaluations are given to sites which are destroyed or have extremely limited information content or which cannot be dated or attributed to a particular culture group.

The survey results show that 11.5 percent of the sites in the sample are of S1 evaluations. This indicates that approximately 200 sites on public lands can be reasonably estimated as meeting National Register criteria.

The nature of cultural resources in the area is reflected in Table II-20, which shows the cultural affiliation of sampled sites by environmental zones, the size of each zone, and the proportion of the zone areas actually sampled. The location of the environmental zones is shown on Map II-7 which also shows the location of each sample unit.

In addition to cultural affiliation, the nature of the cultural resources in the area can be described by reference to site functions and physical characteristics. As with cultural affiliation, site functional types are not uniformly distributed throughout the area. The following four functional site types have been identified and their distribution by environmental zone is shown in Table II-21. In Table II-22 this data has been correlated to culture types.

Basecamp-Habitation:

Permanent or recurring habitation sites including campsites, pit houses or surface structures depending upon the technological development of the cultural group.

Table II-20

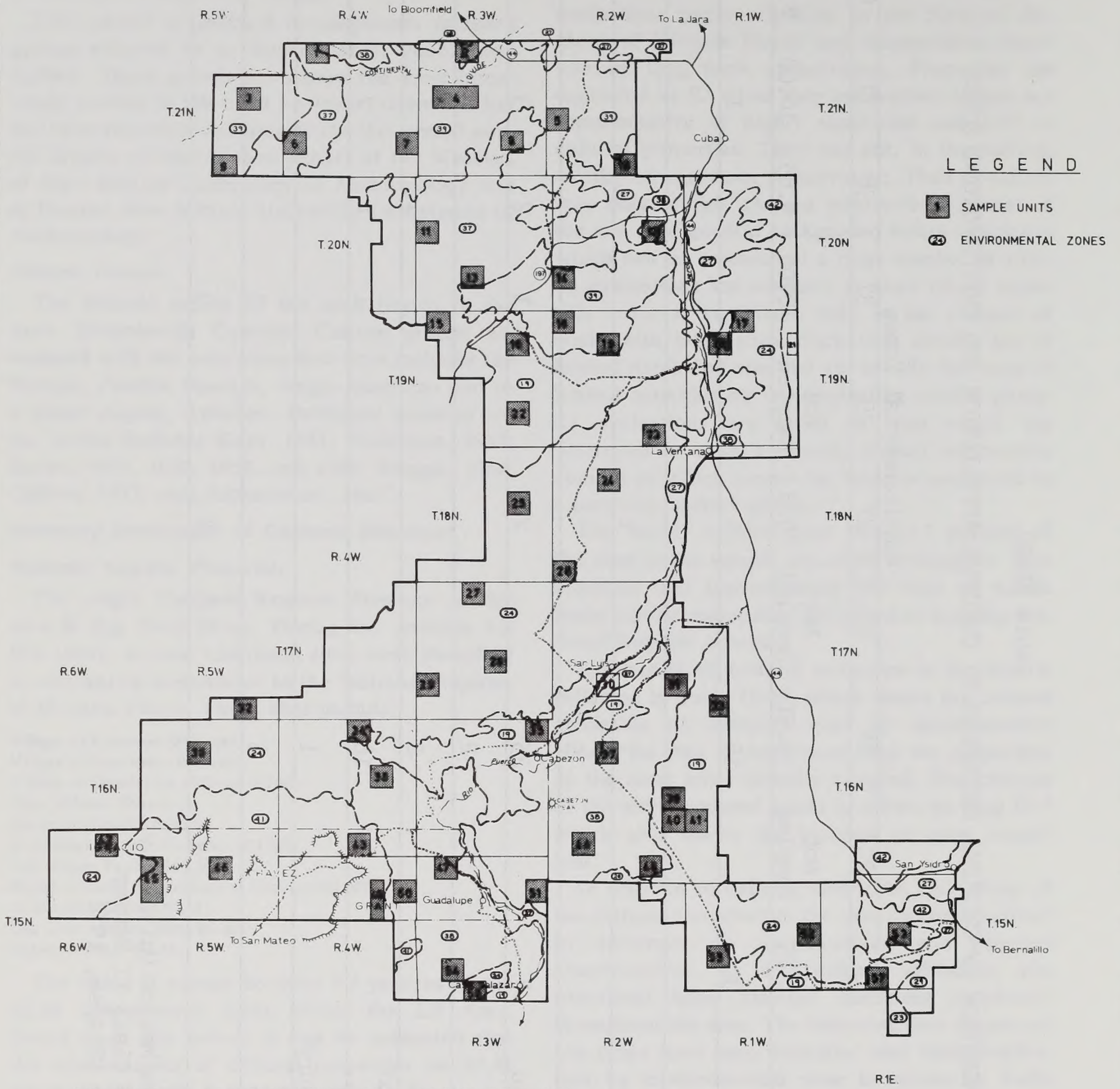
DISTRIBUTION OF CULTURAL RESOURCES BY CULTURAL AFFILIATION AND ENVIRONMENTAL ZONES

	Environmental Zones										
	19	23	24	26	27	29	37	38	39	41	42
Percent of BLM Acres Surveyed	10.27	Not Sampled	9.51	Not Sampled	9.8	Not Sampled	10.08	9.65	10.08	7.91	8.81
Archaic Sites	3		15		1				1		
Basket Maker III			1								
Pueblo I			1		1						
Pueblo II			5						1		
Indeterminate Pueblo	4		25		2		1	2	3		5
Gallina			2						2		
Navajo 18th and Early 19th Century			2					1	1		
Navajo Late 19th and Early 20th Century			18				1	6	2		
Hispanic Late 19th and Early 20th Century			1					1			
Anglo-American	2		8				3		7		1
Indeterminate Affiliation	1		10		4		3	1	4		

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

CULTURAL RESOURCES ENVIRONMENTAL ZONES

RIO PUERCO E.S. AREA



SOURCE: ALBUQUERQUE BLM DISTRICT FILES

MAP II-7

Table II-21

DISTRIBUTION OF CULTURAL RESOURCES BY SITE TYPES
AND
ENVIRONMENTAL ZONES

(Sample Data)

Environmental Zones	Basecamp-Habitation	Subsistence-Resource Loci	Support Facilities	Socio-Religious	Indeterminate
19	3	6	1		
23					
24	61	21	7	7	2
26					
27	1	7			
29					
37	4	4			
38	8	3			
39	13	5	1	2	
41					
42	7	1	1		

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

Table II-22

DISTRIBUTION OF CULTURAL RESOURCES SITE TYPE AND CULTURE TYPES BY ENVIRONMENTAL ZONES

(Sample Data)

ENVIRONMENTAL ZONE 19

	Type of Site				
Culture Type	Indeterminate	Basecamp-Habitation	Subsistence-Resource Loci	Support Facilities	Socio-Religious
Indeterminate	-	-	1	-	-
Early Hunter Gatherers	-	-	3	-	-
Prehistoric Horticulture	-	2	2	-	-
Historic Groups	-	1	-	1	-

ENVIRONMENTAL ZONE 24

	Type of Site				
Culture Type	Indeterminate	Basecamp-Habitation	Subsistence-Resource Loci	Support Facilities	Socio-Religious
Indeterminate	2	2	5	-	1
Early Hunter Gatherers	-	6	9	-	-
Prehistoric Horticulture	-	36	6	1	1
Historic Groups	-	17	1	6	5

ENVIRONMENTAL ZONE 27

	Type of Site				
Culture Type	Indeterminate	Basecamp-Habitation	Subsistence-Resource Loci	Support Facilities	Socio-Religious
Indeterminate	-	-	4	-	-
Early Hunter Gatherers	-	-	1	-	-
Prehistoric Horticulture	-	-	-	-	-
Historic Groups	-	1	2	-	-

Table II-22 (continued)

ENVIRONMENTAL ZONE 37

	Type of Site				
Culture Type	Indeterminate	Basecamp-Habitation	Subsistence-Resource Loci	Support Facilities	Socio-Religious
Indeterminate	-	-	3	-	-
Early Hunter Gatherers	-	-	-	-	-
Prehistoric Horticulture	-	-	1	-	-
Historic Groups	-	4	-	-	-

ENVIRONMENTAL ZONE 38

	Type of Site				
Culture Type	Indeterminate	Basecamp-Habitation	Subsistence-Resource Loci	Support Facilities	Socio-Religious
Indeterminate	-	-	1	-	-
Early Hunter Gatherers	-	-	-	-	-
Prehistoric Horticulture	-	-	2	-	-
Historic Groups	-	8	-	-	-

ENVIRONMENTAL ZONE 39

	Type of Site				
Culture Type	Indeterminate	Basecamp-Habitation	Subsistence-Resource Loci	Support Facilities	Socio-Religious
Indeterminate	-	1	3	-	-
Early Hunter Gatherers	-	1	-	-	-
Prehistoric Horticulture	-	4	2	-	-
Historic Groups	-	7	-	-	-

Table II-22 (continued)

ENVIRONMENTAL ZONE 42

	Type of Site				
Culture Type	Indeterminate	Basecamp-Habitation	Subsistence-Resource Loci	Support Facilities	Socio-Religious
Indeterminate	-	-	-	-	-
Early Hunter Gatherers	-	-	-	-	-
Prehistoric Horticulture	-	6	1	-	-
Historic Groups	-	1	-	1	-

TOTAL SAMPLE

	Type of Site				
Culture Type	Indeterminate	Basecamp-Habitation	Subsistence-Resource Loci	Support Facilities	Socio-Religious
Indeterminate	2	3	17	-	1
Early Hunter Gatherers	-	7	13	-	-
Prehistoric Horticulture	-	48	14	1	1
Historic Groups	-	38	3	9	7

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

Subsistence-Resource Loci:

Areas of subsistence and other resource extraction or processing activities.

Support Facilities:

Support facilities for widespread subsistence activities such as water control structure and livestock pens.

Socio-Religious:

Special activity areas of religious and social significance not functionally related to resource uses, such as rock art sites and sweat lodges.

Location of Cultural Resources

The following discussion describes the correlation of cultural resources with land forms and vegetative communities on the public lands of the area. Table II-23 shows the acres of each sampled zone which are made up of three different land form classes. Land form classes are based on the following characteristics:

Local Elevations—Includes hilltops, ridges, mesa tops and terraces.

Low Relief—Includes valley bottoms, valley slopes, canyon bottoms, gently sloping and rolling uplands.

Steep and Broken Lands—Includes arroyos, breaks, escarpments, cliff faces and talus slopes.

The density of sites per square mile (640 acres) is shown in Table II-24. The density of cultural resources is demonstrably higher in areas of local elevation which constitute 28 percent of the area sampled. Areas of local low relief show the lowest density of cultural material and comprise 54 percent of the area sampled. Steep and broken lands which make up 18 percent of the sampled lands show a moderate to high density. Table II-25 shows the distribution of cultural sites correlated with vegetative communities.

During the Class II survey, the preservation condition of cultural properties was recorded. Table II-26 shows the current condition of cultural properties in the area based on the sample data. An estimate based on the sample would infer that 85.5 percent of the cultural properties on public lands in the ES Area are in poor physical condition. The sources of deterioration at sites recorded in the sample are shown in Table II-27. In the total sample, 78 percent of the sites are deteriorated as a result of erosion alone. All sites recorded in the sample have been affected by erosion, approximately fifteen percent have been additionally affected by land use projects, and nine percent have been vandalized.

The Bureau of Land Management has the preservation and protection of cultural resources as its basic cultural resource management objective. The cultural resources in the area require a variety of measures to maintain the existing situation (see Table II-28). These protection measures form the base line for considering impacts and mitigation measures of the proposed action and alternatives. The protection measures listed are not to be considered as mitigation measures of the impacts of the proposed action or any of the alternatives. They reflect the existing management situation for cultural resources independent of any other land use activities in the area.

The significance of cultural resources in the area was assessed from both heritage values and the potential for scientific study. Table II-29 shows the percentage distribution of site evaluations demonstrated by the sample survey. The distribution of significant evaluations resulting from the sample survey indicate an important scientific potential in zone 24 which had not been previously recognized. Comparison of the sample results and current and past research shows that significant potential exists on private lands in zones 19 and 27 which are not reflected on public lands in these zones.

All Known Cultural Resources

There are a total of 507 Cultural Resource sites known within the ES Area. The distribution of these sites by environmental zones by cultural period is shown in Table II-30. Supplementary Reference II-5 in the Albuquerque District Office contains more complete information regarding known cultural resources.

Paleontology

The paleontological resources in the Rio Puerco ES Area were surveyed by the University of New Mexico (Froehlich, et al, 1975). In this survey, 29 sites in or near the area were identified as having paleontological values. From this report it was determined that there are several formations in the area which contain fossils; however, in nearly all cases the fossils are found over a wide geographic range and are well-known in areas outside the ES Area. The one principal exception is in the Morrison Formation of Jurassic age which is known to contain localized bone beds from later Jurassic dinosaur assemblages. See Map II-1 for the location of the Morrison Formation. The pos-

Table II-23

NUMBER OF ACRES OF LAND FORM CLASSES SAMPLED BY ZONE

(Sample Data)

	LAND FORMS		
ENVIRONMENTAL ZONES	Local Elevation	Low Relief	Steep and Broken Lands
19	1,020	4,770	250
23			
24	3,740	4,063	1,257
26			
27	50	2,080	70
29			
37	220	2,880	40
38	1,395	2,855	1,990
39	2,705	3,360	675
41	990	0	2,110
42	500	220	160

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

Table II-24

DENSITY OF CULTURAL SITES PER SQUARE MILE BY LAND FORM CLASS AND BY ENVIRONMENTAL ZONES

(Sample Data)

	LAND FORMS		
ENVIRONMENTAL ZONES	Local Elevation	Low Relief	Steep and Broken Lands
19	2.5	.8	
23			
24	13.0	1.6	6.1
26			
27	64.0	.9	
29			
37	20.4	.3	
38	3.8	.2	.6
39	2.8	1.3	1.9
41			
42	6.4		16.0

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

Table II-25

NUMBER OF CULTURAL RESOURCES CORRELATED WITH VEGETATIVE COMMUNITIES BY ENVIRONMENTAL ZONES

(Sample Data)

	Environmental Zones										
Vegetative Sub-type	19	23	24	26	27	29	37	38	39	41	42
Shortgrass			19					1	1		1
Big sagebrush	1		17		1		3	3	3		
Rabbitbrush	1		1						1		
Four-wing saltbush	2		13		1						2
Cactus	3		4		1				1		1
Broom snakeweed	2		17		1			5			5
Pinyon-juniper	1		23		4		5	2	13		
Ponderosa pine			3						2		
Barren			1								

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

Table II-26

CONDITION OF CULTURAL RESOURCES BY ZONE

(Sample Data)

	Condition (Percent)			
Environmental Zones	Excellent	Good	Poor	Destroyed
19		20.0	80.0	
23				
24	1.0	14.3	84.7	
26				
27			100.0	
29				
37		37.5	62.5	
38		9.2	90.9	
39		9.5	85.7	4.8
41				
42			100.0	

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

Table II-27

NUMBER OF DETERIORATED CULTURAL RESOURCE SITES AND SOURCE OF THE DETERIORATION

(Sample Data)

Source of Deterioration	Environmental Zones										
	19	23	24	26	27	29	37	38	39	41	42
Erosion	7		88		4		4	4	15		8
Erosion and Land Use Projects	3		4		2		4	4	2		1
Erosion and Vandalism			6						4		
Erosion, Vandalism and Land Use Project					2			3			

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

Table II-28

CURRENT PRESERVATION REQUIREMENTS TO STABILIZE THE CONDITION OF CULTURAL RESOURCES

(Sample Data)

Control Level	Environmental Zones										
	19	23	24	26	27	29	37	38	39	41	42
Erosion Control Only	10		81		8		8	10	18		9
Structural Stabilization Only			4								
Structural Stabilization and Fencing			2								
Structural Stabilization and Patrolling			1								
Fencing and Patrolling			2								
Fencing Only			3								
Patrolling Only			5					1	3		

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

Table II-29

PERCENTAGE OF SITE EVALUATIONS BY ZONE

(Sample Data)

Environmental Zones	Evaluations S1	S2	S3	S4
19		10.0%	20.0%	70.0%
23				
24	18.4%	19.4%	46.9%	15.3%
26				
27	12.5%		72.0%	12.5%
29				
37		12.5%	75.0%	12.5%
38			72.7%	27.3%
39		14.3%	71.4%	14.3%
41				
42			44.4%	55.6%

S1	Sites which could have eligibility to National Register of Historic Places.
S2	Sites neither unique nor representative of highly significant scientific or cultural properties.
S3	Sites where scientific value is significant only in the context of study with other sites.
S4	Sites which are destroyed or have extremely limited information content or which cannot be dated or attributed to a particular culture group.

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976

Table II-30

NUMBER OF KNOWN SITES BY CULTURE PERIOD BY ENVIRONMENTAL ZONE

Culture Period	Environmental Zones 19	23	24	26	27	29	37	38	39	41	42
Unknown	2		11		4		3	8	4		
Paleo-Indian					1		2				
Archaic	3		15		2		1		1		
Basket Maker II					1			1			
Basket Maker III			1					11			1
Pueblo I			2		8			43			
Pueblo II	1	2	5		19	5		66	1		
Pueblo III	3	1	12		12			33			3
Pueblo IV	1	1	6		7			3	1		4
Pueblo V						1			1		
Pueblo Indian (Undifferentiated)	4		27		7		1	30	3		5
Gallina			2		1				3		
Navajo Early			2					24	1	1	1
Navajo Late			18				1	7	2		
Apache							2				
Spanish Late	2		1		1			19			
Anglo American	2		9			1	5	4	7		1

Source: Albuquerque BLM District Inventory File sibility of finding extensive deposits of bone in the area is probably small.

Visual Resources

Landscape Character

The most pronounced characteristic of the area is the remote, natural quality of the landscape (see Figure II-12). The basic landscape elements of color, form, line and texture vary greatly. Dominant colors are red, brown, tan and dark gray, from the soils and rocks; and moderate variations of greens, grays and tans from vegetative sources. The topography (form) is characterized by rolling to flat valleys, broken sandstone and lava-capped mesas (see Figure II-13). Physiographically, the majority of the area is Upper Sonoran. The semi-arid climate results in rather sparse vegetation, chiefly shortgrass comprised of grama grasses, galleta and wheatgrass. The woodland regions in the upper elevations on the mesa tops are chiefly pinyon-juniper, oak, mountain mahogany and scattered ponderosa pine (see Figure II-14). Vegetation distribution is closely related to elevation.

REMOTE NATURAL QUALITY

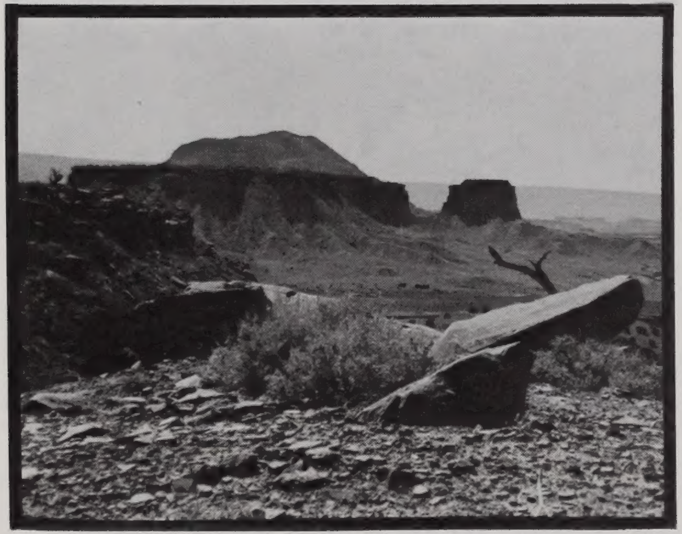


FIGURE II-12

The dominant line and texture characteristics are represented by rugged, often ragged mesa edges with strong horizontal line influence. Vertical lines are subordinate and are represented by the mesa sides and volcanic plugs in the flat valley bottoms. The valley floors, which are rolling to flat with sparse vegetation, contrast in texture characteristics to the markedly more rugged mesa features. Visual distance factors on the valley floors also contribute in moderating the valley bottom characteristics which are coarser than actually perceived (see Figures II-15 and II-16).

The deep and often wide cutting arroyos are the only other contrasting factor affecting visual character in the area. These arroyos interrupt line, form and texture elements, and create a disturbance in visual flow.

TOPOGRAPHY

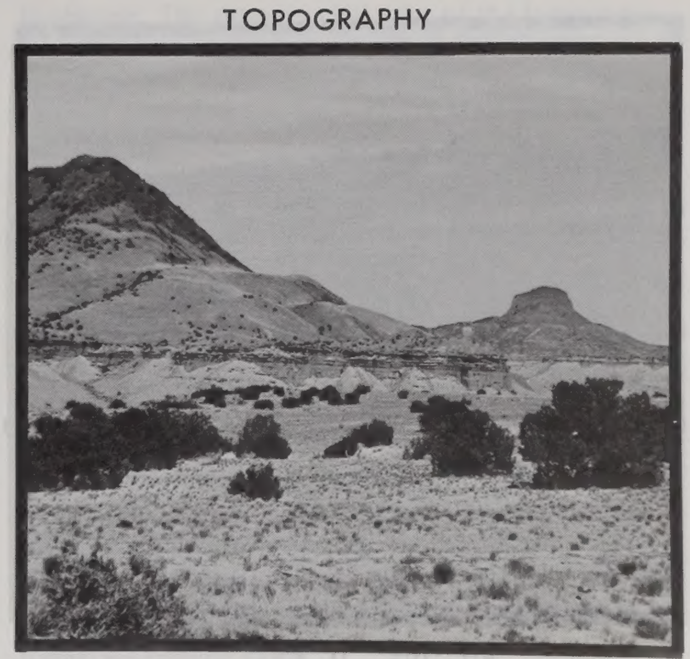


FIGURE II-13

WOODLANDS

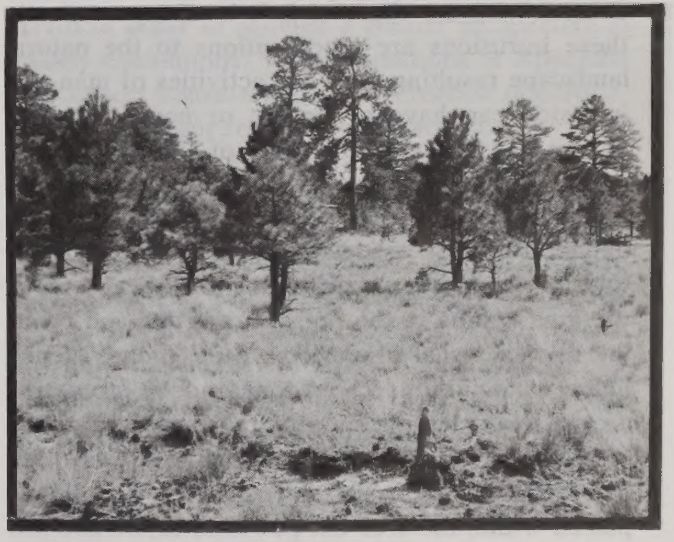


FIGURE II-14

LINE

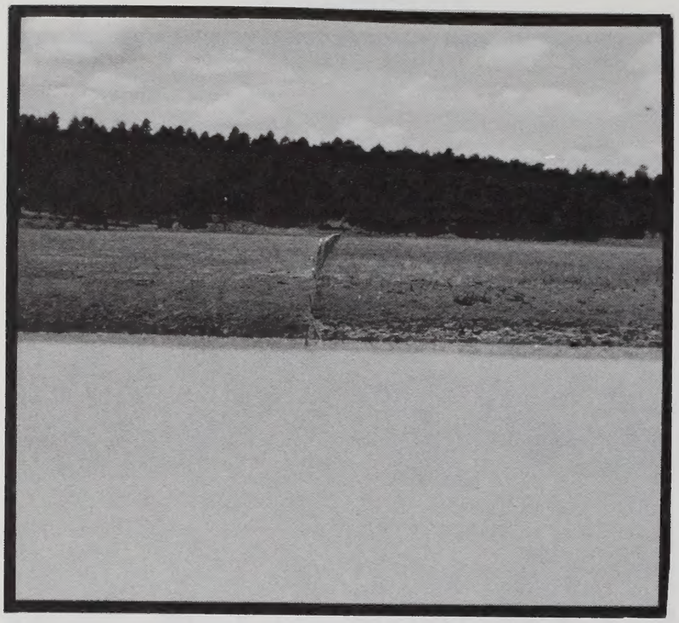


FIGURE II-15

Intrusions

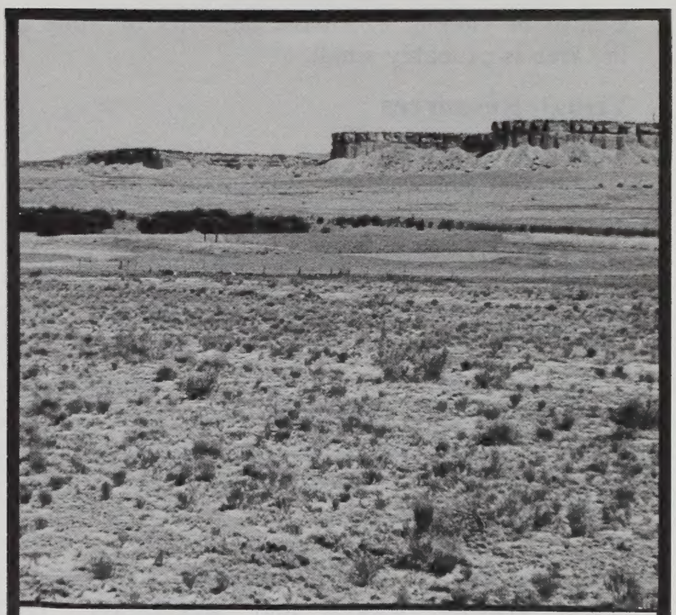
An intrusion is a feature (land, vegetation, or structure) which is generally considered out of context with the characteristic landscape. Usually these intrusions are modifications to the natural landscape resulting from the activities of man. An intrusion can have a positive or negative visual impact and is included as one of the key factors in evaluating scenic quality.

Intrusions in the area with the greatest visual impact are those associated with its 200 year history of livestock grazing. This historical use of the area results in the present ranching and farming related visual instrusions. Stock ponds, fence lines, windmills, and abandoned adobe structures are all examples not only of the ranching history of the area, but are also part of the present day use of the area. The most recent visual intrusions placed within the area are power lines, oil and gas wells, and minimal surface disturbance due to mineral extractions of coal and humates. These energy related intrusions are expected to increase as demand for energy sources increases.

Existing intrusions have been classified as to the degree which they have modified or intruded upon the natural landscape. This is known as the magnitude of contrast and each intrusion was rated on one of three different levels of contrast.

Magnitude of Contrast

Low—Contrast will not attract attention from landscape character.



TEXTURE

FIGURE II-16

Medium—Attracts attention and begins to dominate landscape character.

High—Demands attention, will not be overlooked, dominates landscape character.

The water developments within the area make up many of the existing intrusions. Troughs, stock ponds, wells, catchments, reservoirs, and spring developments generally fit in with the landscape, and therefore have a low to medium contrast rating. Water developments such as windmills, storage tanks, and pumping stations are more visually distracting and rate a medium contrast rating.

Clearcuts, chaining, burns and vegetative manipulation along pipeline and fence routes are short-term intrusions but cause enough contrast in the natural landscape to have a medium to high contrast rating. Utility lines, highway routes and the resulting cleared linear rights-of-way generally have a contrast rating of medium. Oil and gas well developments in the area rate a medium magnitude of contrast. Mining developments such as humate and coal exploration create minimal visual intrusions at the present time.

Old homesteads, including abandoned adobe structures, trace the farm and ranch settlement of the area up to modern houses and buildings. Although these features have modified or intruded upon the natural landscape, they are a special part of the historical and cultural heritage of the area. The total magnitude of visual intrusions within the area is low in relationship to the area it encompasses. This is due primarily to the sparse population, lack of industrial developments, and the unusually large amount of public lands.

Visual Resource Management Process

To more specifically describe the visual resources, the BLM classification system for visual resources must be understood. The process classifies the landscape into visual resource management (VRM) units for the purpose of evaluating the amount of modification which the visual character of the natural landscape can sustain. Minimum quality standards for management of the visual resources can then be established (See Appendix II-3).

The VRM unit boundaries are based on three factors: the scenic quality, the visual sensitivity and the visual distance. The scenic quality is an evaluation of the quality of the scenery as determined through the use of the scenic evaluation process. Visual sensitivity is the visual response to an area in relation to the entire area. Visual distance zones are simply a direct relationship between observer position and the landscape features being observed. The Albuquerque District Office contains an in-depth discussion on the establishment of VRM classes in the ES Area (Supplementary Reference II-6).

Visual Resource Management Classes

To determine the visual resource management classes, the scenic quality, sensitivity level and visual zone maps are combined for each area. Each VRM class describes a different degree of modification allowed in the basic elements of the landscape. The primary character of the landscape should be retained regardless of the degree of modification. The degree of modification for each class is described on Table II-31. Map II-8 shows the existing VRM classes in the Rio Puerco ES Area.

Recreation Resources

The Bureau of Land Management's Recreation Information System (RIS) has been employed in describing the existing recreational environment in the Rio Puerco ES Area. For the purposes of comparison, the area was divided into fifteen recreation rating areas (see Map II-9) which were evaluated for five recreation opportunities. These opportunities were:

Off-road Vehicle Use (ORV)
Sightseeing—Scenic
Sightseeing—Geological
Hunting
Natural and Primitive Values

Appendix II-4 shows the recreation evaluations for these opportunities. In addition, the recreation opportunities of the Rio Puerco ES Area were compared with those of a larger area (see Map II-10) in order to provide a greater perspective in quality evaluations. The designations in Appendix II-4 reflect consideration of recreation opportunities in this larger region of comparison.

Estimates for recreation use data (visitor days) are summarized in Table II-32. These estimations are derived from BLM knowledge of user activities in the area, local feedback, analysis of existing use/demand data and personal experience. The data is useful for relative comparison purposes as it enables the reader to grasp a general picture of recreation use levels in the area and compare them with the use trends discussed in Appendix I-4. The data will further aid the reader in determining the effect on recreation use levels that the proposed action may have.

General Landscape Character

RIS identified two areas in the Rio Puerco ES Area which possess potentially high primitive values. In addition, the area received a high rating for geologic sightseeing. Other recreation activities include hunting and off-road vehicle use. Although the area does possess a degree of remoteness and solitude, the necessary complimentary factors that result in primitive or natural area designations do not exist. Factors such as

Table II-31

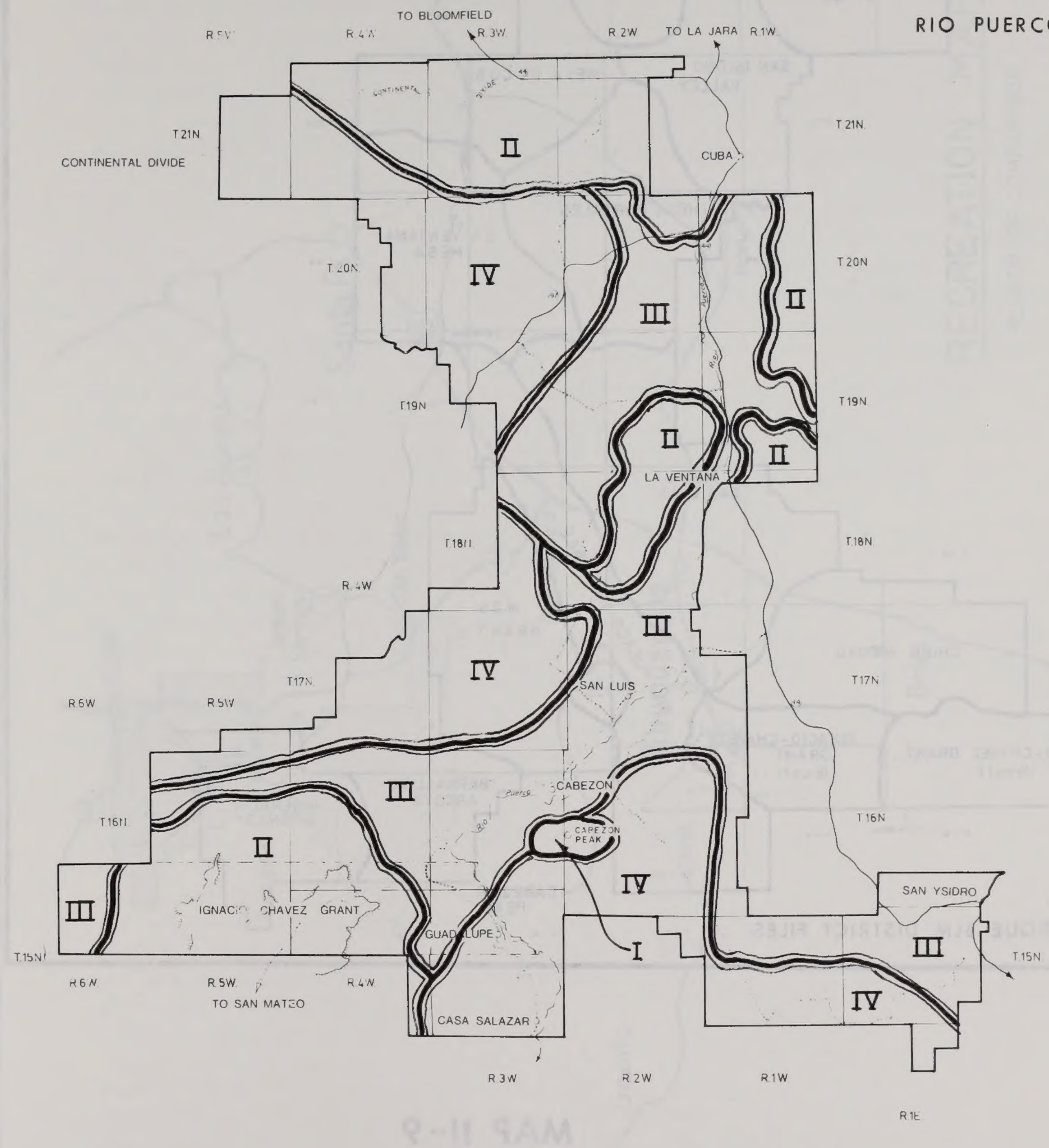
VISUAL RESOURCE MANAGEMENT CLASSES

Class I	-	This class provides primarily for natural ecological changes only. It is applied to primitive areas, some natural areas, and other similar situations where management activities are to be restricted.
Class II	-	Changes in any of the basic elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.
Class III	-	Changes in the basic elements (form, line, color, texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
Class IV	-	Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.
Class V	-	Change is needed. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. This class would apply to areas identified in the scenery evaluation where the quality class has been reduced because of unacceptable intrusions. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objective should be identified.

Source: BLM District Files

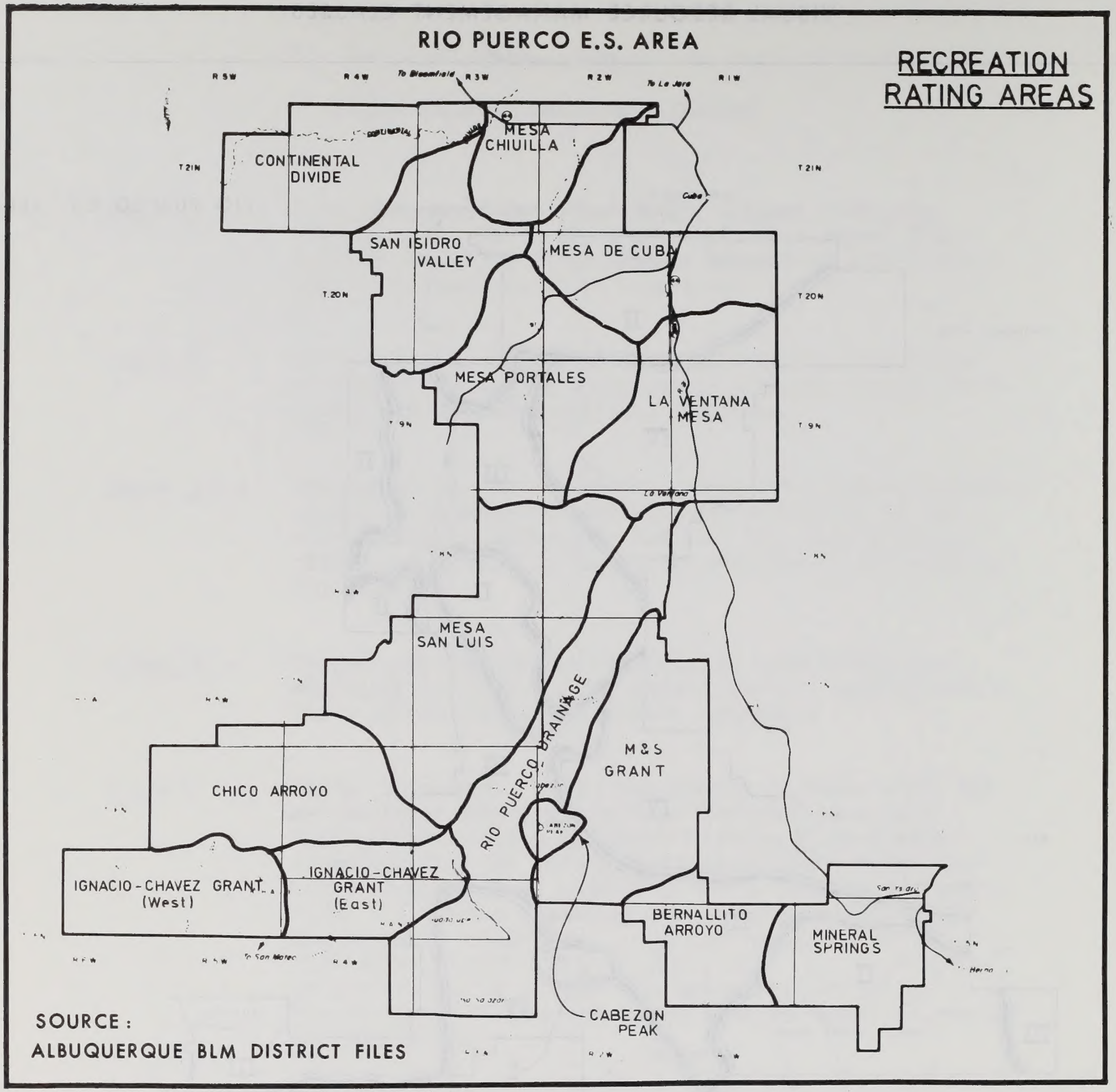
VISUAL RESOURCE MANAGEMENT CLASSES

RIO PUERCO E.S. AREA



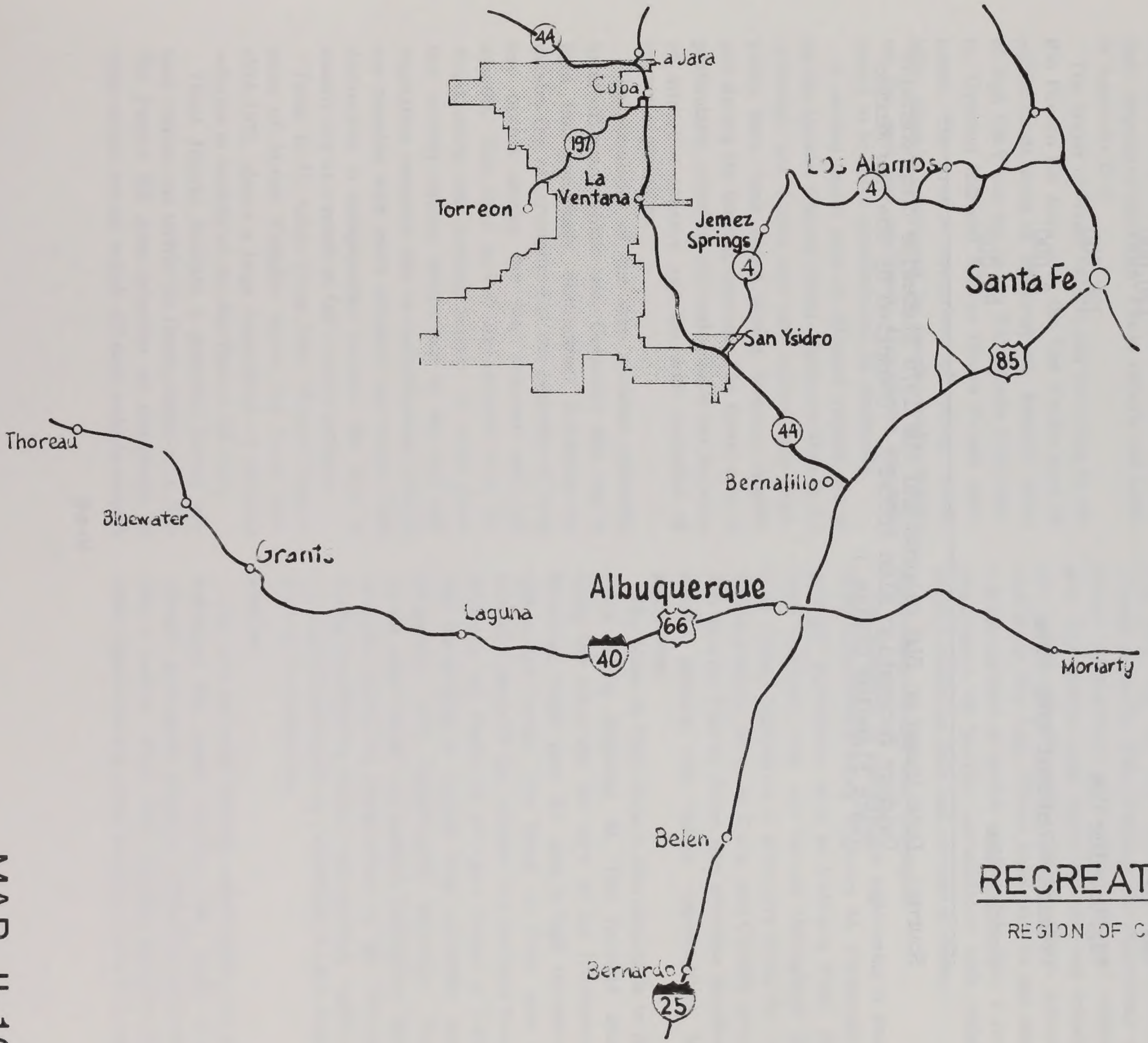
SOURCE: BLM DISTRICT FILES

MAP II-8



SOURCE:
ALBUQUERQUE BLM DISTRICT FILES

MAP II-9



RECREATION MAP

REGION OF COMPARISON

MAP II-10

Table II-32

ESTIMATED RECREATION USE LEVELS (VISITOR DAYS) BY RECREATION ACTIVITY FOR RIO PUERCO ES AREA

Activities	(Annual) Estimated Visitor Use Days
ORV Use	170,000
Sightseeing Use	324,000
Primitive/Natural Area Uses	4,000
Hunting Use	46,000

Source: Data based on BLM records and the 1976 Statewide Comprehensive Outdoor Recreation Plan (SCORP). (Compiled by the New Mexico State Planning Office.)

distance, lack of water resources and access contribute to the generally low recreation potential of the ES Area.

Off-road Vehicle Use

Depending upon specific activities, certain landscape characteristics are desired in off-road vehicle use. The Motorcycle Association of New Mexico has prepared a set of criteria of terrain selection for specific activities. While these criteria are intended primarily for motorcycle utilization, four wheel drive and other forms of adverse terrain vehicles seek similar standards for their respective activities. These criteria are listed in Appendix II-5.

The major off-road vehicle use occurring in the Rio Puerco ES Area is in the San Ysidro area on public lands west of Highway 44. Specific areas of high ORV use are in the Rio Salado Community, Gypsum Hill and Arroyo Piedra Parada allotments. The area is comprised of rolling, sandy hills, sharply contrasted by rough, rocky breaks on the east and northeast. Use levels are estimated to be more concentrated on weekends.

A second major area of off-road vehicle use is on the Ignacio Chavez Grant. (Refer to Map II-9.) Although use levels are not exceedingly high, peaks have been noted during summer months and during the hunting seasons. The Grant area is particularly suited to off-road vehicle use because of attractive scenery and the wide variation of terrain experiences.

The remainder of the area receives primarily local off-road vehicle use. Generally this use is light but potentially destructive. Evidence indicates (by observation) that the majority of local use occurs during the late summer and fall months. This time period corresponds with the woodcutting and hunting season. In some areas this activity causes destruction to the soil and vegetation resource due to indiscriminate vehicle use coupled with more frequent use levels. This destruction is compounded because the land is usually dry as a result of fall weather patterns.

Table II-33, taken from New Mexico Department of Motor Vehicles shows for fiscal year 1974-1975, shows a large registration of off-road vehicles in vicinity of the Rio Puerco ES Area.

These figures indicate a potential heavy off-road vehicle use within the three-county area. The Rio Puerco ES Area provides an abundance of open scenic terrain which off-road vehicle owners seek out. Variety and challenges in the steepness and length of slopes along with sparse population make a great deal of the area advantageous for off-road vehicle use. Its relatively close proximity to Albuquerque makes the area even more attractive to the large number of off-road vehicle owners living there. The New Mexico State Comprehensive Outdoor Recreation Plan, completed in September 1975, reports the current recreation off-road vehicle demand for the three counties of McKinley, Sandoval, and Bernalillo is 236,415 visitor days per year. Actual estimated visitor day use level for the ES Area is approximately 170,000 annually. This indicates the importance of proper management of potential off-road vehicle use. The higher rated areas for off-road vehicle use include the Bernalillo Arroyo, Chico Arroyo and Mesa San Luis. These areas include not only a large amount of usable terrain, but also, a preponderance of heavily consolidated soils which creates minimum dust and erosion problems.

Sightseeing—Scenic and Geological

The majority of recreational sightseeing is done from automobiles along Highway 44. Outstanding geologic formations such as Cabezon Peak, the large volcanic plug, are viewed throughout the area. Scenic sightseeing is attractive along the La Ventana Mesa, Mesa de Cuba, and Chiuilla areas. The Ignacio Chavez Grant also provides excellent natural scenery and unique opportunities for sightseeing.

The Mesa de Cuba area is also accessible to the public along Highway 44. The forested areas along the mesa and the view of the Nacimiento Mountain range give the area a high recreation and scenic value. The Mesa de Cuba area is located outside of the western and southern boundaries of the Santa Fe National Forest at Cuba. The topography is several large sandstone mesa formations with intermingled drainages. Ponderosa pine stands are located throughout Mesa de Cuba along the fringe areas of the National Forest boundaries. Scenic and geologic sightseeing values contribute an estimated 324,000 visitor days to recreation use.

Hunting

The area provides hunting opportunities for the following big game species: elk, mule deer, western pronghorn antelope, black bear and Merriam's turkey. Mule deer hunting provides the most significant big game hunting. There is a scat-

Table II-33

OFF ROAD VEHICLE REGISTRATION

County	4-Wheel Drive Trucks	Recreation Vehicles	Motor-cycles
McKinley	4,088	611	953
Sandoval	1,800	589	537
Bernalillo	24,225	10,843	12,045
TOTAL	30,113	12,043	13,535

Source: New Mexico Department of Motor Vehicles tering of deer over most of the area, but hunting occurs mostly in the Chiuilla area along the west slopes of the Nacimiento Mountains and on the Ignacio Chavez Grant.

Ninety-three percent of the New Mexico Game Management Unit 14 is in the Rio Puerco ES Area. The New Mexico Game and Fish Department shows that over the past six years an annual average of 316 hunters harvested 23 elk from the area for an average success ratio of 7.2 percent. An annual average of 1,222 hunters harvested 155 mule deer for an average success ratio of 11.9 percent. An increase of hunters within the last five years reflects a decrease in hunter success (see Appendix II-6). Estimated hunter days for the area exceed 46,000 annually. This figure includes all types of hunting (game and non-game including birds).

Natural and Primitive Values

Ignacio Chavez Grant

The Ignacio Chavez Grant provides an excellent opportunity for a hiking or wilderness camping recreation experience. The area rates very high in scenic sightseeing qualities. This, combined with its relative remoteness, makes the area unique and high in qualities as a near-primitive area.

The Ignacio Chavez Grant is a rectangular shaped parcel of land eighteen miles long and four miles wide covering approximately 45,941 acres. Located along the northern-most tip of Mesa Chivato, the Grant is an amplified version of what wildlife biologists refer to as an edge. In contrast to smaller edge habitat, this edge covers several miles and displays several abrupt environmental transitional zones.

These transitional zones offer diverse habitats for wildlife, particularly big game species such as deer and elk. Because of the excellent wildlife habitat available, the Ignacio Chavez Grant has supplied sustenance and other survival needs for many past cultures. Recreation use levels vary on the Grant, depending upon time of year. Spring and Fall uses are known to be highest. Estimated visitor days for all forms of recreation activity reach approximately 36,000 annually.

Mineral Springs Area

The Mineral Springs area also provides an excellent opportunity for near wilderness recreation experience due to its outstanding geologic formations and remote location. As with the Ignacio Chavez Grant, this area is also remote with even more difficult access. The Mineral Springs area lies approximately 27 air miles northwest of Albuquerque. (See Map II-9.)

The outstanding geologic formations of the Mineral Springs area make it feasible for inclusion into the BLM's recreation program. Vertical cliffs over 150 feet in height border the area on all but the northeast end, protecting it from uncontrolled access. Looking south from State Highway 44 en route to Cuba, the area appears as nothing but bleak, unyielding rock. However, entry into the area from the south affords the visitor with magnificent views of the entire sheltered valley. Several naturally sheltered areas lend themselves to development as picnic sites. The proximity of a major metropolis (Albuquerque) adds importance to protection of the recreation potential of the area. Visitor use of the Mineral Springs area is almost exclusively for sightseeing. Use is estimated to be approximately 1,100 visitor days annually. The highest use period is Spring during moderate weather.

Livestock Grazing

Livestock grazing has occurred in the Rio Puerco vicinity for at least 200 years. Historically, livestock grazing increased from the relatively few grazed during the 1700s to reach approximately 240,000 sheep and 9,000 cattle during the 1870s. The range deteriorated rapidly under this grazing pressure, erosion increased and water tables dropped (Calkins, 1937). The deterioration along with a depressed market gradually reduced livestock numbers on the Rio Puerco range.

Today, there are 134 holders of BLM livestock licenses which confer grazing privileges in the Rio Puerco ES Area. During the 1975-76 grazing year these licensees possessed grazing privileges of 58,225 AUMs (equivalent to 4,852 animal units). Grazing privileges were established years ago in most cases, but actual use is lower. This is due partly to voluntary non-use of privileges and partly to BLM's required suspension of licensed use because forage does not exist.

In 1975, BLM conducted an intensive Resource Inventory in the Rio Puerco ES Area. This Resource Inventory found that forage capacity was inadequate to support the overall livestock numbers permitted under the specified grazing privileges. The inventory revealed discrepancies throughout the range. While most ranches lacked the forage to support their full livestock grazing privileges, the land occupied by some was found capable of supporting more livestock grazing than that permitted under the established system.

There is variance in livestock management practices between the north and south ends of the area (see Map II-11). This variance is somewhat influenced by climatic differences within the area. Because of the milder climate in the southern portion of the area, more licensees tend to run their bulls yearlong with the main herd. (See Table II-34 for summary of management practices in the northern and southern portions of the area.)

Primary breeds of cattle used in the northern and southern portions differ slightly. Bulls and cows in both areas are primarily Hereford, Angus, Charolais and Galloway, but the southern herds also include Brangus and Santa Gertrudis bulls. There are cross breed cows of Hereford, Angus, Charolais and Galloway in both areas, but generally bulls in both the north and south areas are not cross breeds.

Approximately 82 percent of the licensees in the northern portion of the area graze non-registered livestock. Eighteen percent graze a few registered cattle, primarily bulls. In the southern portion 79 percent graze non-registered cattle and 21 percent graze a few registered cattle, primarily bulls. One licensee grazes a registered herd.

The only free-use allotment (The Lagunitas Community Allotment) in the northern part of the area is also the only allotment grazing sheep and goats. At present, four of the five licensees utilizing the allotment graze a total of 65 sheep and 60 goats seasonally. Horses found in the area are saddle horses owned by licensees; there are no wild horses or burros. Eighty-five percent of the licensees in the southern area also graze their allotments yearlong compared to thirty-nine percent in the northern area.

Weaning and shipping of calves for the total area is usually done in October and November with some shipping done in December. An estimated five to ten percent of the licensees wean their calves in April and May. Licensees normally retain an estimated fifteen percent of their calf crops annually as replacement heifers.

Seventy-six percent of the licensees in the northern area also sell yearlings as compared to 53 percent in the southern area. Comparisons of average yearling selling weights are shown in Table II-34.

Approximately 82 percent of the licensees in the northern area provide supplemental feeding compared to 38 percent in the southern area. These figures primarily represent feeding done during the winter months. Most of the licensees provide supplemental feed, i.e., protein/mineral saltblocks.

Other Grazing Lands

Twenty-nine percent of the licensees in the northern area have additional grazing lands (privately owned or controlled) compared to 22 percent in the southern area. Predator losses (primarily by coyotes) are reportedly higher in the northern areas with 72 percent of the operators reporting losses compared to eighteen percent in the south.

Movement of cattle from public lands to private or leased grazing lands is primarily done by truck, especially in the southern portion of the ES Area. An estimated 50 percent of the licensees in the north portion, trail cattle to forest allotments.

Allotment Information

Currently there are 96 allotments within the Rio Puerco ES Area with Allotment Management Plan (AMP) status as follows:

Allotments with AMPs written and implemented:	
Individual (only one license)	11
Community (two to ten licenses)	10
Subtotal	21
Allotments with AMPs written but not implemented:	
Individual	5
Community	1
Subtotal	6
Allotments without AMPs written:	
Individual	54
Community	15
Subtotal	69
Total Allotments in the Rio Puerco ES Area	96

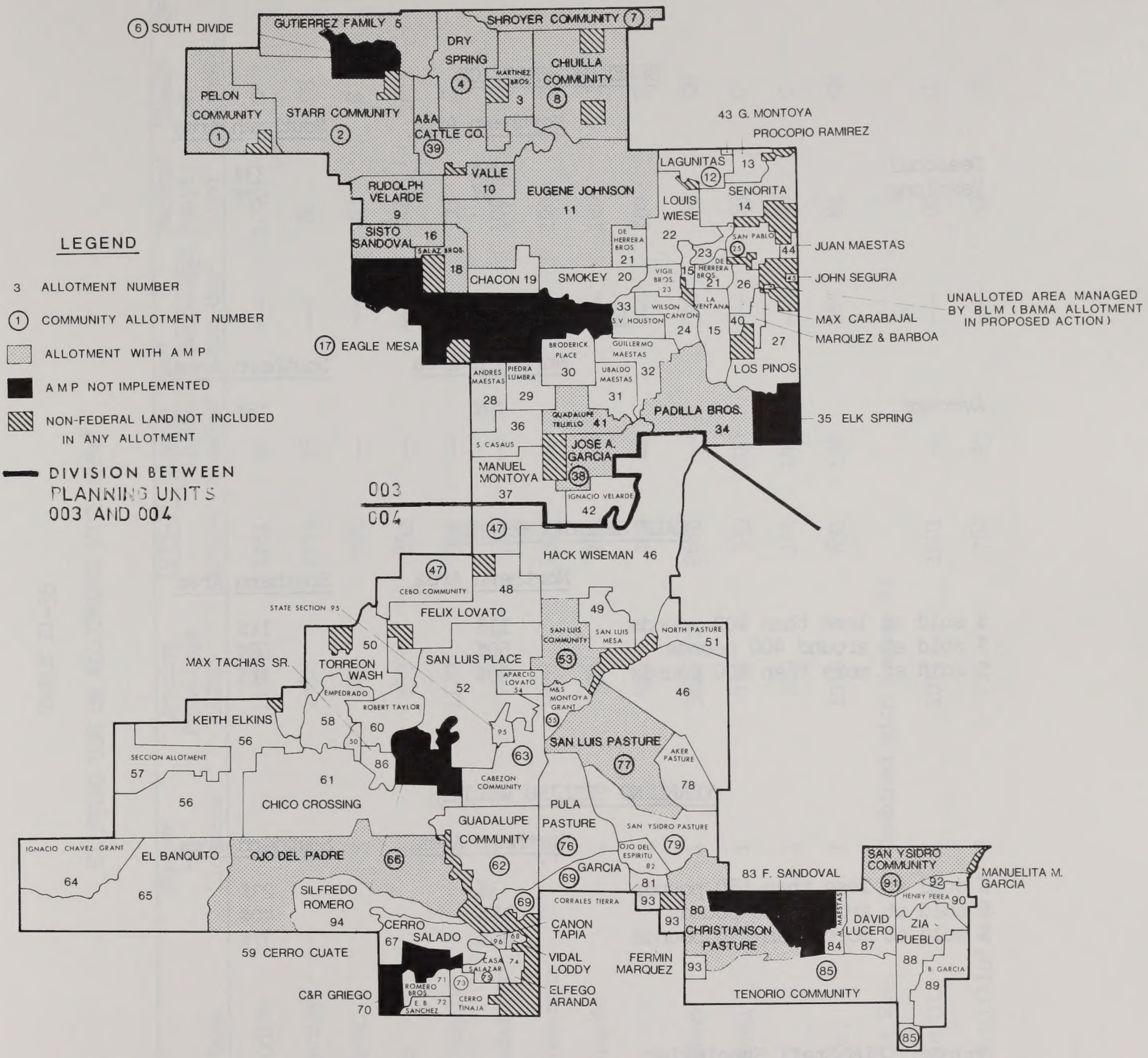
Allotments have been assigned numbers as they occur in the area from north to south (see Map II-11). Of the 27 AMPs, allotment numbers 38 (Jose A. Garcia, est.) and 41 (Guadalupe Trujillo) are managed under one AMP (see Tables II-35 and II-36).

The six AMPs presently not implemented are:

	Allotment Number
South Divide	6
Eagle Mesa	17
Elk Springs	35
Cerro Cuate	59
C & R Griego	70
F. Sandoval	83

EXISTING ALLOTMENTS

RIO PUERCO E.S. AREA



SOURCE: BLM DISTRICT FILES

MAP II-11

Table II-34

Summary of Livestock Management Practices

BREEDING PRACTICE

	Northern Area	Southern Area
Seasonal	95%	33%
Yearlong	5%	67%

CALF CROPS

	Northern Area	Southern Area
Average	79%	78%

CALF SELLING WEIGHTS

	Northern Area	Southern Area
% sold at less than 400 pounds	11%	11%
% sold at around 400 pounds	50%	68%
% sold at more than 400 pounds	39%	21%

YEARLING SELLING WEIGHTS

	Northern Area	Southern Area
% sold at less than 550 pounds	3%	23%
% sold at around 550 pounds	17%	40%
% sold at more than 550 pounds	80%	37%

Source: BLM Staff Specialist

TABLE II-35

EXISTING USE ON ALLOTMENTS WITH AMPs[a]

Allotment[b] Number	Allotment Name	Number of Licenses	Grazing Privilege AUMs[c]	1975-76 License Use[d]			Percent Public Land	Class[g] of Livestock	Season[h] of Use
				Active	Voluntary Non-Use[e]	Suspended Non-Use[f]			
1	Pelon Community	4	1197	1161	36	—	100	C	SpFW
2	Starr Community	2	1788	1773	15	—	82	CH	Year
3	Martinez Bros.	3	543	495	—	—	83	C	SpFW
4	Dry Springs	1	850	851	—	—	92	C	Year
5	Gutierrez Family	1	1120	966	—	154	93	C	SpFW
7	Shroyer Community	3	743	706	—	—	100	C	SpFW
8	Chiuilla Community	10	1828	1829	—	—	100	C	Year[i]
9	Rudolph Velarde	1	780	780	—	—	100	CH	Year
10	Valle	1	480	483	—	—	100	C	SpSuF
11	Eugene Johnson	1	3236	2688	—	548	80	CH	Year
16	Sisto Sandoval	1	439	339	100	—	83	C	Year
18	Salaz Bros.	1	289	144	145	—	89	C	Year
34	Padilla Bros.	1	1010	631	194	185	81	CH	Year
38	J. A. Garcia Est.	Combined with Number 41							
39	A & A Cattle Co.	1	1017	1021	—	—	96	C	Year
41	Guadalupe Trujillo[j]	2	789	764	25	—	51	CH	Year

Table II-35 (continued)

Allotment[b] Number	Allotment Name	Number of Licenses	Grazing Privilege AUMs[c]	1975-76 License Use[d] Active	1975-76 License Use[d] Voluntary Non-Use[e]	1975-76 License Use[d] Suspended Non-Use[f]	Percent Public Land	Class[g] of Livestock	Season[h] of Use
53	San Luis Community	7	792	792	--	---	100	CH	Year
66	Ojo Del Padre	4	1792	1800	--	---	100	C	Year
77	San Luis Pasture	6	1474	1474	--	---	100	C	Year
80	Christianson Pasture (Pipeline Allotment)	1	1234	1233	1	---	96	CH	Year
84	Macario Maestas	1	120	120	--	---		C	Year
91	San Ysidro Grant Community	4	228	228	--	---	100	C	Year
	Total[k]	56	21,749	20,278	548	887			

a. There are currently 28 allotments with AMPs. Two, Jose A. Garcia Estate and Guadalupe Trujillo, are combined under one AMP.
b. Allotments are numbered as they occur in the area generally from north to south.
c. Privileges established according to BLM grazing regulations prior to 1975 resource inventory.
d. Differences between licensed use and privileges are the result of rounding off for fractional AUMs.
e. Non-use of grazing privileges initiated by licensee.
f. Non-use of grazing privileges required by BLM grazing regulations.
g. Class of livestock: C=Cattle; H=Horses; S=Sheep and goats.
h. Period when livestock are on public lands: Sp=Spring; Su=Summer; F=Fall; W=Winter; Year=Yearlong.
i. Chiuilla Community Allotment has a licensee using seasonal grazing; one has yearlong use.
j. The Guadalupe Trujillo AMP includes Number 38, Jose A. Garcia Estate.
k. For totals from all allotments see last page of Table II-36.

Source: BLM Section 3 Files

TABLE II-36

EXISTING USE ON ALLOTMENTS WITHOUT AMPs[a]

Allotment[b] Number	Allotment Name	Number of Licenses	Grazing Privilege AUMs[c]	1975-76 License Use[d] Active	1975-76 License Use[d] Voluntary Non-Use[e]	1975-76 License Use[d] Suspended Non-Use[f]	Percent Public Land	Class[g] of Livestock	Season[h] of Use
6	South Divide	3	612	444	--	168	100	C	Year
12	Lagunitas Community	5	144	144	--	---	66	CHS	Year
13	Procopio Ramirez	1	192	191	1	---	76	C	SpW
14	Senorita	1	271	269	2	---	48	CH	SuFW
15	LaVentana	1	324	324	--	---	77	C	SpFW
17	Eagle Mesa	1	1634	1644	--	---	83	CH	Year
19	Chacon	1	118	118	—	---	33	C	SpFW
20	Smokey	1	720	480	240	---	100	C	Year
21	DeHerrera Bros.	1	376	375	1	---	78	C	SpFW
22	Louis Wiese	1	438	440	--	---	47	CH	Year
23	Vigil Bros.	1	152	152	—	---	42	C	Year
24	Wilson Canyon	1	239	201	38	---	67	C	Year
25	San Pablo	2	144	84	60	---	60	CH	SpSuF
26	Max Carabajal	1	110	110	--	---	36	CH	SpW
27	Los Pinos	1	195	194	1	---	24	CH	Year
28	Andres Maestas	1	456	456	—	---	95	C	Year

Table II-36 (continued)

Allotment[b] Number	Allotment Name	Number of Licenses	Grazing Privilege AUMs[c]	1975-76 License Use[d] Active	Voluntary Non-Use[e]	Suspended Non-Use[f]	Percent Public Land	Class[g] of Livestock	Season[h] of Use
29	Piedra Lumbre	1	240	213	27	—	71	C	Sp
30	Brodrick Place	1	441	439	2	—	77	C	SpW
31	Ubaldo Maestas	1	300	292	8	—	81	C	Year
32	Guillermo Maestas	1	421	340	81	—	82	C	Year
33	S. V. Houston, Est.	1	231	230	1	—	62	C	SpW
35	Elk Springs	1	242	50	82	110	85	C	SpSuF
36	S. Casaus	1	367	367	—	—	68	CH	Year
37	Manuel Montoya	1	620	620	--	—	70	CH	Year
40	Marquez & Barboa	1	35	41	--	—	26	C	Year
42	Ignacio Velarde Est.	1	300	246	54	—	45	C	Year
43	G. Montoya	1	12	12	--	—	25	C	Year
44	Juan Maestas	1	48	30	18	—	67	CH	SuF
45	John Segura	1	12	12	--	—	100	C	Year
46	Hack Wiseman	1	2796	2000	796	—	66	C	Year
47	Cebo Community	3	1135	1084	51	—	92	CH	SpFW
48	E. Lovato	1	1164	1162	2	—	88	C	Year
49	San Luis Mesa	1	268	159	109	—	53	C	Year

Table II-36 (continued)

Allotment[b] Number	Allotment Name	Number of Licenses	Grazing Privilege AUMs[c]	1975-76 License Use[d] Active	Voluntary Non-Use[e]	Suspended Non-Use[f]	Percent Public Land	Class[g] of Livestock	Season[h] of Use
50	Torreon Wash	1	642	390	252	—	50	CH	Year
51	North Pasture	2	240	288	—	—	100	C	Year
52	San Luis Place	1	1567	1564	3	—	77	CH	SpW
54	Aparcio Lovato	1	180	180	—	—	75	C	Year
55	M&S Montoya Grant	2	360	360	—	—	100	CH	SuFW
56	Keith Elkins	1	1909	984	925	—	82	CH	Year
57	Seccion	1	678	590	88	—	91	CH	SpFW
58	Empedrado	1	428	303	125	—	79	CH	Year
59	Cerro Cuate	1	488	488	—	—	70	CH	Year
60	Robert Taylor	1	496	471	15	10	77	C	Year
61	Chico Crossing	2	2131	2047	84	—	82	CH	Year
62	Guadalupe Community	4	696	468	—	—	71	CH	Year
63	Cabezon Community	4	625	477	148	—	83	CH	Year
64	Ignacio Chavez Grant	1	576	576	—	—	100	CH	Year
65	El Banquito	1	1836	1836	—	—	100	CH	Year
67	Cerro Salado	1	396	399	—	—	77	C	SpSuF
68	Vidal Loddy	1	24	24	—	—	50	C	Year

Table II-36 (continued)

Allotment[b] Number	Allotment Name	Number of Licenses	Grazing Privilege AUMs[c]	1975-76 License Use[d]			Percent Public Land	Class[g] of Livestock	Season[h] of Use
				Active	Voluntary Non-Use[e]	Suspended Non-Use[f]			
69	Garcia	3	904	772	10	—	95	CH	Year
70	C&R Griego	1	377	308	69	—	72	CH	SpSuF
71	Romero Bros.	1	108	108	—	—	60	C	Year
72	E. B. Sanchez	1	84	84	—	—	100	C	Year
73	Cerro Tinaja	2	205	205	—	—	55	C	Year
74	Elfego Aranda, Jr.	1	96	96	—	—	100	C	Year
75	Casa Salazar	4	156	149	7	—	100	CH	Year
76	Pula Pasture	6	1380	1380	—	—	100	C	Year
78	Aker Pasture	1	504	504	—	—	100	C	SpFW
79	San Ysidro Pasture	3	876	504	—	—	100	C	Year
81	Corrales Tierra	1	120	120	—	—	100	C	Year
82	Ojo Del Espiritu	1	246	252	—	—	100	C	Year
83	F. Sandoval	1	408	409	—	—	85	C	Year
85	Tenorio Community	2	778	778	—	—	61	CH	Year
86	Max Tachias, Sr.	1	173	164	9	—	72	CH	Year
87	D. Lucero	1	288	290	—	—	69	C	Year
88	Zia Pueblo	1	480	480	—	—	100	C	Year

Table II-36 (continued)

Allotment[b] Number	Allotment Name	Number of Licenses	Grazing Privilege AUMs[c]	1975-76 License Use[d] Active	Voluntary Non-Use[e]	Suspended Non-Use[f]	Percent Public Land	Class[g] of Livestock	Season[h] of Use
89	B. Garcia	1	272	273	—	—	65	C	Year
90	Henry Perea	1	181	181	—	—	94	C	Year
92	Manuelita Garcia	1	48	48	—	—	67	C	Year
93	Fermin Marquez	1	191	191	—	—	53	C	Year
94	Sifredo Romero	1	600	600	—	—	100	C	Year
95	State Section	2	19	19	—	—	15	C	Sp
96	Canon Tapia	1	12	9	3	—	33	C	Year
	Totals Without AMPs	107	36,535	32,292	3,312	288			
	Totals With AMPs	56	21,749	20,278	548	887			
	Grand Total	163[i]	58,284	52,570	3,860	1,175			

a. There are currently 68 allotments without AMPs
b. Allotments are numbered as they occur in the area generally from north to south
c. Privileges established according to BLM grazing regulations prior to 1975 resource inventory
d. Differences between licensed use and privileges are the result of rounding off for fractional AUMs.
e. Non-use of grazing privileges initiated by licensee
f. Non-use of grazing privileges required by BLM grazing regulations
g. Class of livestock: C=cattle; H=horses; S=Sheep and goats
h. Periods when livestock are on public lands: Sp=Spring, Su=Summer, F=Fall, W=Winter, Year=Yearlong
i. There are actually 134 licensees within the Rio Puerco ES Area. Several licensees have more than one license - thus the total of 163.

Active, voluntary non-use and suspended non-use columns can not be added to get grazing privileges because voluntary non-use was not always requested.

Source: BLM Section 3 Files

Grazing privileges are 58,225 AUMs in the area. (Grazing privileges are AUMs established according to BLM grazing regulations prior to the 1975 forage inventory. These privileges do not necessarily correspond to available forage. See Chapter I, Proposed Allotments for more information.) Active licensed use for 1975-76 however, was 52,570 AUMs. See last page of Table II-36 for summary.

Existing AMP Allotments

Five allotments with AMPs are presently grazed seasonally, generally in conjunction with Forest Service permits, while sixteen are grazed yearlong. All the existing AMP allotments are cattle (cow/calf) operations with seven of 21 allotments also licensed to graze from one to four horses. For the 21 implemented AMP allotments, the present qualifications are 21,749 AUMs annually, of which 887 AUMs are held in suspended non-use status. (Suspended non-use is non-use of grazing privileges initiated by BLM because forage does not exist.)

Range improvements to implement AMPs have been constructed primarily by BLM. Most of the allotment boundary fences and some water developments were constructed by licensees prior to implementation of AMPs.

Existing Non-AMP Allotments

Twenty non-AMP allotments are presently grazed seasonally, in conjunction with forest permits and other private lands. The remaining 54 non-AMP allotments are grazed yearlong. The non-AMP allotments presently have no grazing systems or schedule. A yearly license designates the numbers and season of use on these allotments. Most of the existing non-AMP allotments are cow/calf operations with 28 of the 74 allotments also licensed to graze horses. In addition to this, Lagunitas has sheep and goat use. For the 74 non-AMP allotments the present grazing privileges are 36,535 AUMs annually, and active licensed use is 32,292 AUMs of which 288 AUMs are held in suspended non-use status.

Prior to 1964, an estimated 50 percent of the non-AMP allotments also had some form of permanent or semi-permanent water such as wells, or partially developed springs. The remaining fifty percent used small earthen reservoirs, natural catchments, or hauled their own water. The majority of these improvements constructed on the non-AMP allotments were constructed by licensees.

Range improvements on non-AMP allotments have not been as extensive as in AMP allotments. In 1964 the Rio Puerco Watershed Project was funded and construction started. From 1964 through 1971 several large erosion control structures were constructed throughout the Rio Puerco ES Area, indirectly benefitting livestock management and production.

Crossing permits are granted to all licensees (AMP or non-AMP) in accordance with BLM regulations. In 1975 two crossing permits were issued. These were permitted for one or two days in duration to allow trailing along a road to a forest allotment.

Trespass Notices are issued under the following conditions (AMP or Non-AMP):

(1) Livestock in Wrong Pasture;
(2) livestock numbers in excess of paid grazing license;
(3) livestock on allotment during unauthorized grazing period; and
(4) livestock on allotment prior to grazing fee payment.

Mineral Resources

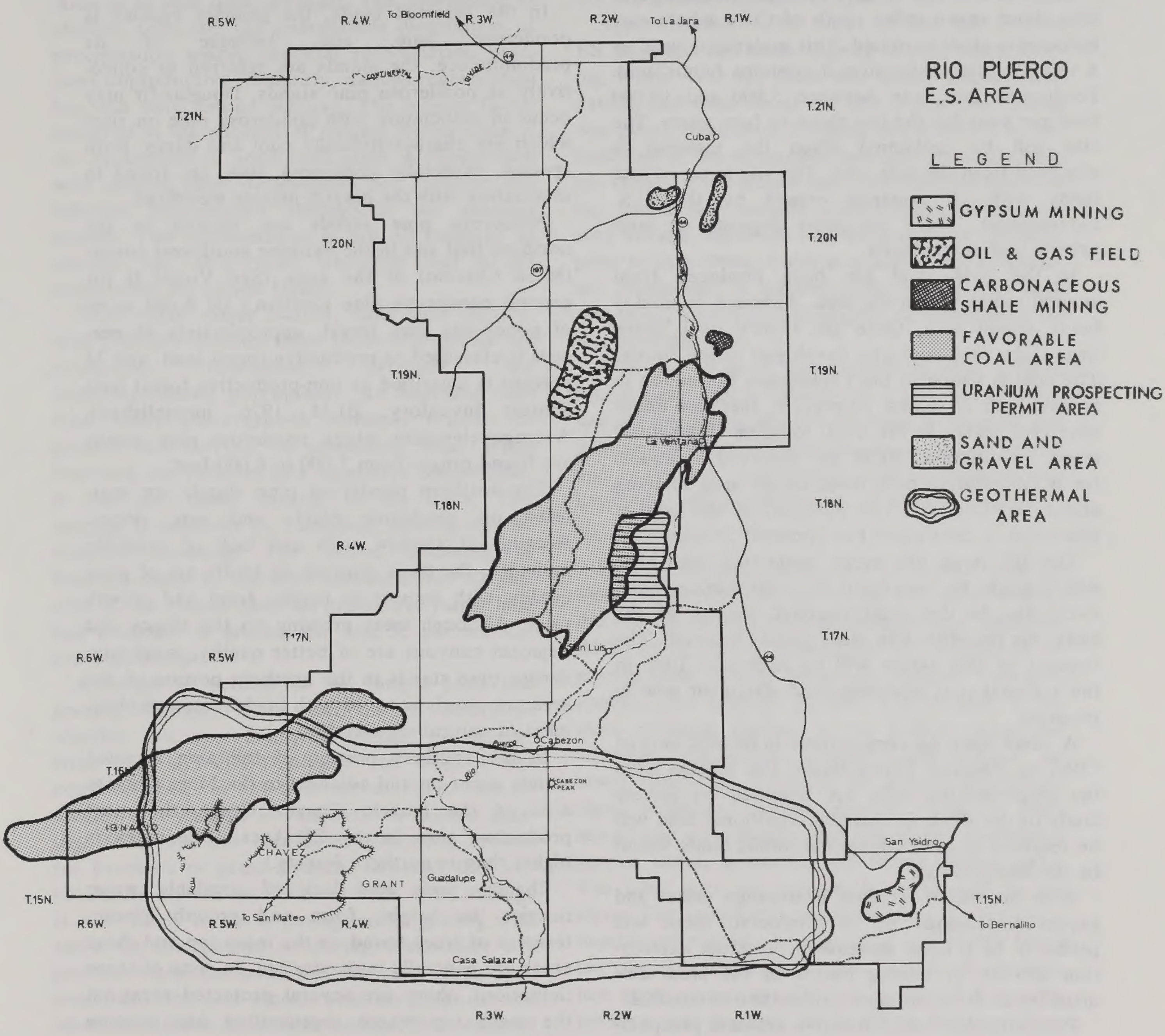
Within the Rio Puerco ES Area, mineral resources include gypsum, oil and gas, sand and gravel, and carbonaceous shale. In addition to these minerals which are currently being mined, coal is present in the area, and there is a possibility that uranium and geothermal steam are also present. The Bureau of Land Management, in cooperation with the U.S. Geological Survey, reviews all mineral leases on public lands in the area. Federal jurisdiction includes responsibility for approving access, drilling locations, refining and mining plans, and reclamation requirements. See Map II-12 for general mineral locations.

In the southeastern part of the area Mr. J. Griffith is presently open-pit mining gypsum under valid mining claim locations. This area encompasses about 200 acres of public lands and about 100 acres of private mineral lands.

Oil and gas are presently being produced from the Media Field in the central part of the area. Although this field has limited production, oil and gas exploration is increasing and some new larger fields may be discovered. Most of the oil and gas production in this area would be from public lands, therefore, most of the exploration would also be on public lands.

Presently, there are several small pits near Cuba providing sand and gravel products for local

MINERAL RESOURCES



SOURCE: BLM DISTRICT FILES

MAP II-12

governmental units and contractors. These pit areas will eventually be reclaimed through permit and contract stipulations. The total amount of material authorized from public lands during 1975 was 1,250 cubic yards. This was from material sales and private use permits to state and county agencies.

There is also one 10-acre open-pit mining operation about seven miles south of Cuba where carbonaceous shale is mined. This material is used as a soil conditioner because it contains humic acid. Production has been between 5,000 and 10,000 tons per year for the last three to four years. The site will be reclaimed when the material is removed from the sale area. The site is on private lands with all minerals owned by the U.S. Government. There are other deposits on both private and public lands.

In the past, coal has been produced from several mines within the area. Although no coal is being mined now, there are several coal leases near Cuba that could be developed in the future. The coal is found in the Cretaceous Formation in several beds or seams. At present, there are about nine coal leases in the area, totalling about 9,600 acres. In addition, BLM has received a request for a competitive coal lease on an area totalling about 28,000 acres. The potential of this coal is discussed in the Future Environment Section.

The ES Area has areas containing coal beds which might be recovered by strip mining; however, due to the great regional dipping of the beds, the possible strip areas should be small. The impacts of this action will be addressed fully in the regional coal environmental statement now in progress.

A small open-pit copper mine is located east of Cuba on National Forest lands. The tailings from the concentrating mills are disposed on private lands to the west. Eventually, additional land will be required to hold tailing and public lands would be the likely source.

With the recent increase in uranium prices and expected demands for this mineral, there will probably be a large increase in uranium exploration activity or mining claims in the area. The disturbance from uranium exploration is minimal.

Presently there are ten active uranium prospecting permits on acquired lands. Most of this prospecting is being done by a major mining company and if deposits of valuable uranium are discovered, they would be able to fully develop them.

Forestry

There are two major types of tree covered areas within the Rio Puerco ES Area: forested lands comprised of sawtimber trees, and woodlands comprised of species which are typically used for forest products other than sawtimber.

In the forested lands, the primary species is ponderosa pine, and, because of its predominance, the stands are referred to collectively as ponderosa pine stands. Douglas-fir may occur in association with ponderosa pine on sites which are characteristically cool and damp. Both species, especially ponderosa pine, are found in association with the pinyon-juniper woodland.

Ponderosa pine stands are located in the northern half and in the extreme southwest corner (Mesa Chivato) of the area. (See Visual B for general ponderosa pine location.) Of 8,600 acres of ponderosa pine forest, approximately 66 percent is classified as productive forest land, and 34 percent is classified as non-productive forest land (Forest Inventory, BLM, 1976, unpublished). Average elevation where ponderosa pine stands are found ranges from 7,000 to 8,000 feet.

The northern ponderosa pine stands are scattered on sandstone bluffs and side slopes. Because of shallow soils and lack of available moisture, the trees growing on bluffs are of poor quality with respect to height, form and growth rates. Although trees growing on the slopes and adjacent canyons are of better quality, most ponderosa pine stands in the northern portion of the area are poorly stocked with inadequate establishment of natural regeneration.

In the southern portion of the area forested stands occur on and adjacent to the Mesa Chivato area of the Ignacio Chavez Grant, the most productive sites in the ES Area. (Site index is higher than in northern forests.)

Shallow soils and lack of available water restrict the height, form and growth characteristics of trees found on the mesa top and these areas are generally understocked. In spite of these limitations, there are several protected areas on the mesa top where regeneration has become established to the point where overstocking is present. These areas, however, are not common. Trees growing on slopes and adjacent canyons are generally of better quality than trees found on the mesa top. Most of the ponderosa pine stands are marginal in that the site index is quite low. This low vigor contributes to its high suseptibility to damage by disease, insects, fire and weather damage. If the trees are damaged, this low vigor condition reduces their ability to ward off and recover from all damage agents.

Regeneration of ponderosa pine within the ES Area is at best quite difficult. The prevalence of shallow soils and the unfavorable distribution of precipitation makes artificial reforestation practices unproductive. Similarly, natural regeneration has had only limited success. The biggest factor involved in the success of natural regeneration is the occurrence of good seed years in conjunction with several years of adequate and properly distributed precipitation throughout the growing season. This phenomenon is not as frequent as desired, and, as a result, whatever trees do get established are valued highly.

Three other major factors, other than climate, which dictate whether these trees will survive are competing vegetation, livestock and rodents(primarily porcupines). An ungrazed area with heavy grass growth seriously retards the growth and survival of ponderosa pine. While livestock use removes this vegetative competition, it also can cause damage to the trees. This damage is primarily by trampling, rubbing and incidental browsing. The recent inventory of forested lands in the area indicated that 82 percent of the sample plots on productive forest land had evidence of grazing use and 32 percent had grazing damage.

Although 32 percent of the sample plots had grazing damage, it is difficult to determine whether this was livestock damage or damage from deer and elk. Generally, the damage was confined to one or two trees on each plot. This indicates that damage is incidental to normal grazing. Trees are not considered preferred browse for livestock or game animals, although they occasionally nip off the terminal buds. This damage is most likely to occur during winter grazing with snow on the ground or during abnormally dry periods when the trees are the only green feed available. First and second year seedlings are the most susceptible to severe damage. It is difficult to determine what effect this has had on the establishment of new seedlings. Generally, heavy grazing is detrimental to young timber, while light or moderate grazing helps reduce competition and keeps damage to a minimum.

Porcupines also can cause severe tree damage. These animals typically girdle the tree in the main stem, usually in the upper half of the tree; thereby, seriously deforming the trees. Fire has not been a problem, primarily due to the lack of continuous fuels to carry a fire. Past grazing use has limited the accumulation of light fuels which are the primary carriers of fire.

Approximately 4,200 acres of the Rio Puerco ES Area has had some logging in past years. During World War II, there was much uncontrolled cutting and until about the late 1950s, the cutting was poorly regulated. Logging has occurred in virtually all of the accessible area and primarily only the canyons and slopes have not received harvesting. Incomplete records make it impossible to assess volume removed and frequency of harvests prior to mid-1960s. Current management practices are prescribed to remove poor quality and high risk trees, while maintaining the environmental integrity of the area.

With the value of wood products increasing in recent years, these forests are increasing in value and are becoming more economical to harvest and manage. With continued improvements in access and harvesting techniques, it is anticipated that harvesting will continue and possibly increase.

Woodlands

The woodlands, comprised of pinyon and juniper cover approximately 181,355 acres within the Rio Puerco ES Area (Unit Resource Analysis, BLM 1970). These woodlands are composed of pinyon pine, Rocky Mountain Juniper, one-seed juniper, and alligator juniper. Pinyon pine is the most common species in the higher elevations, whereas one-seeded juniper predominates on lower sites. (See Visual B for general pinyon-juniper locations.) These species occur in both mixed and pure stands with the higher elevational pinyon stands producing the better quality trees. The poor sites are conversely dominated by juniper. The woodlands are increasing in area for a number of reasons with grazing apparently being the biggest contributing cause. Much of the area has been grazed for 200 years and this grazing pressure has depleted the available fuels necessary for carrying a fire. This lack of natural fire has allowed the unimpeded invasion of pinyonjuniper into new areas. Commerical harvesting of these trees has not been done until the past decade. The harvesting of pinyon nuts, primarily by Indians, the cutting of juniper for fence posts and the incidental collection of firewood from dead trees has been occurring for a much longer time.

There has been very little commercial demand for products from these woodlands until recent years. The energy crises, population increases, demand (price), and improved access have all contributed in making these woodlands increasingly important (see Table II-37). There have been no known conflicts between woodland product users and the livestock operators.

Transportation Networks

Transportation systems in the area consist mainly of roads, trails, highways and a rarely used airstrip. (See Map II-13.)

All paved highways (highways 44 and 197) are the responsibility of the state and make up about 53 miles. Unpaved roads make up about 90 percent of the total roads. These dirt roads and trails are generally unimproved and unmaintained (BLM, 1971ff.). Maintenance, when accomplished, is usually done by the County, BLM or the State. Generally two-wheel or four-wheel drive trucks are used in the area with an occasional car being seen off the paved highways.

Many roads have not been surveyed and consequently do not appear on the maps. Road signs are few and driving conditions vary depending upon precipitation. After intense thunderstorms, water and mud flowing in arroyos block roads and create impassable conditions.

In the past, an infrequent problem has been the locking of gates on roads of the area. Due to land ownership patterns, it is not uncommon for a road to cross areas of private, Indian or state land. Many of the roads do not have easements for guaranteed access across these lands. Without easements, access to certain areas may be prevented by the landowner. Occasionally gates are locked on federal land, but these situations rarely occur and are quickly resolved.

Socio-Economics

Rio Puerco Socio-Economic Study Area

The Rio Puerco socio-economic study area consists of the Rio Puerco ES Area and surrounding population centers (see Map II-14). The socio-economics for the existing environment is based on a 1976 study done for BLM by Dr. James R. Gray and Burton C. English of New Mexico State University.

The area is in an isolated rural area with few villages and low population. Probably less than 400 persons (less than one-half person per square mile) actually reside in the ES Area. A much larger number live adjacent to the area and are affected by decisions concerning ES Area use. Consequently, this section will describe both the ranching enterprise and the relationship between the ranching enterprise and the larger Rio Puerco socio-economic study area. Social characteristics (community attitudes and lifestyles) will be discussed at the end of this section.

General Characteristics

The study area produces raw materials with little or no processing beyond the first stages. Livestock grazing of native forage is a traditionally strong element in the local economy. The range resources, however, are severely limited in comparison with demand. Historically, these have been overutilized, and the problem of subsistence on limited grazing resources is accentuated by the special needs of the area's Spanish-American and Indian minority groups. The ethnic precepts and lifestyles and these groups have differed fundamentally from the nation's mainstream society. Many of the operators of small livestock enterprises are employed full time in other pursuits; and almost all licensees live outside the area in communities such as Cuba, Bernalillo and Jemez. Poverty, unemployment, and underemployment are characteristics of the entire area.

Ranch Enterprise

There are three sizes of ranches in the Rio Puerco ES Area: small subsistence ranches (less than 50 head of cattle); small commercial ranches (about 100 head); and medium-sized ranches (about 300 head). The average number of livestock per ranch varies from 32 on subsistence ranches to 355 on medium-size ranches while the total number for all ranches is 6,208.

Population

There are 134 families utilizing grazing land in the Rio Puerco ES Area. The average size of families operating ranches is 3.9 (subsistence, 3.6; small, 3.9; medium, 4.0). The average age of the head of household is 52 years old and their average education level is 10.2 years.

Seventy-five of these operators (56 percent) are resident ranchers or persons who live on or adjacent to their ranch holdings. The remainder of

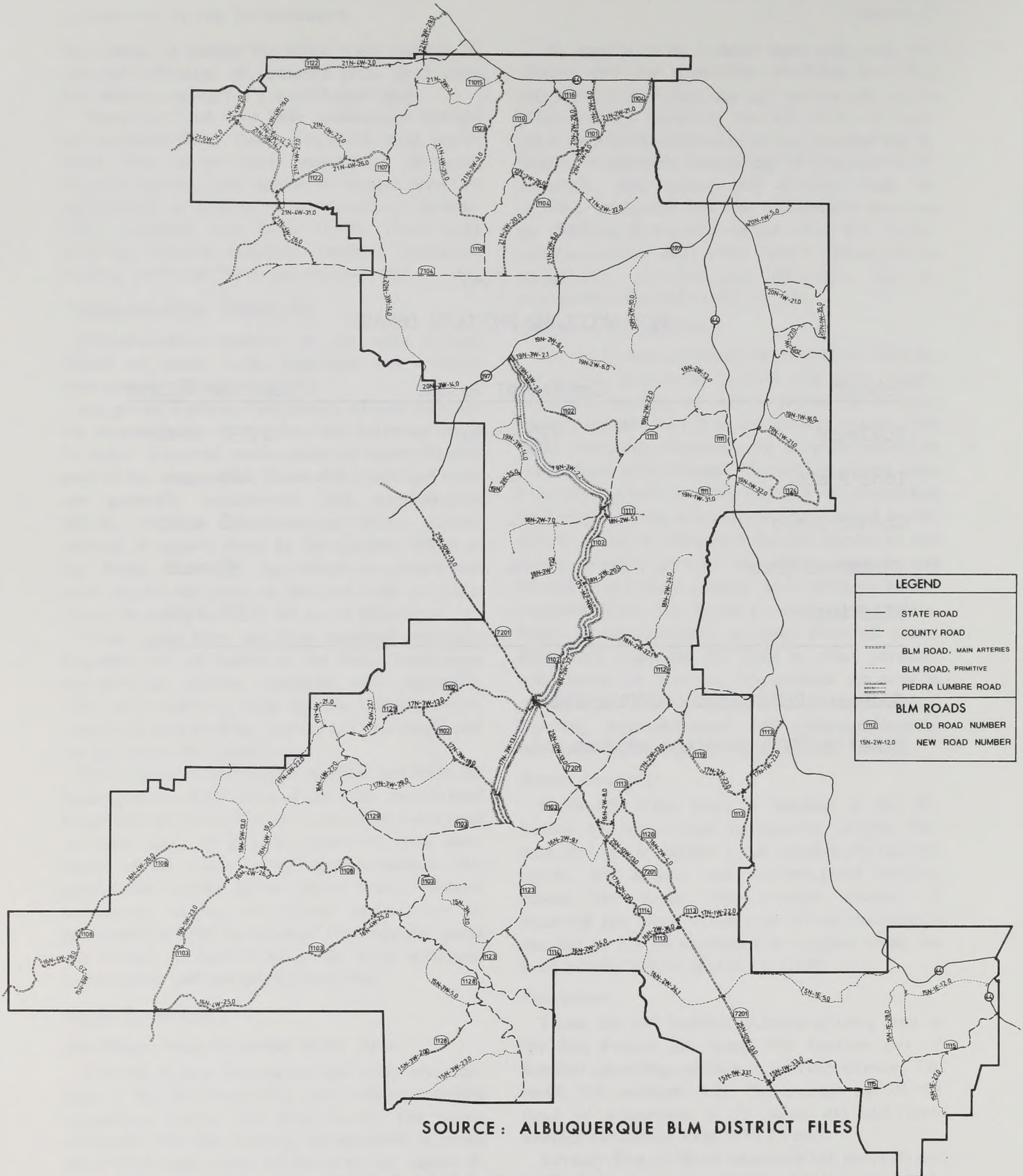
Table II-37

1976 WOODLAND PRODUCTS DEMAND

Product	Commercial Volume	Home Use Volume
Fuelwood	475 cords	1,037 cords
Line Posts	-	467 each
Corner Posts	-	8 each
Christmas Trees	-	35 each
Wildlings	-	394 each

Source: BLM District Office Files

Based on FY76 woodland product sales

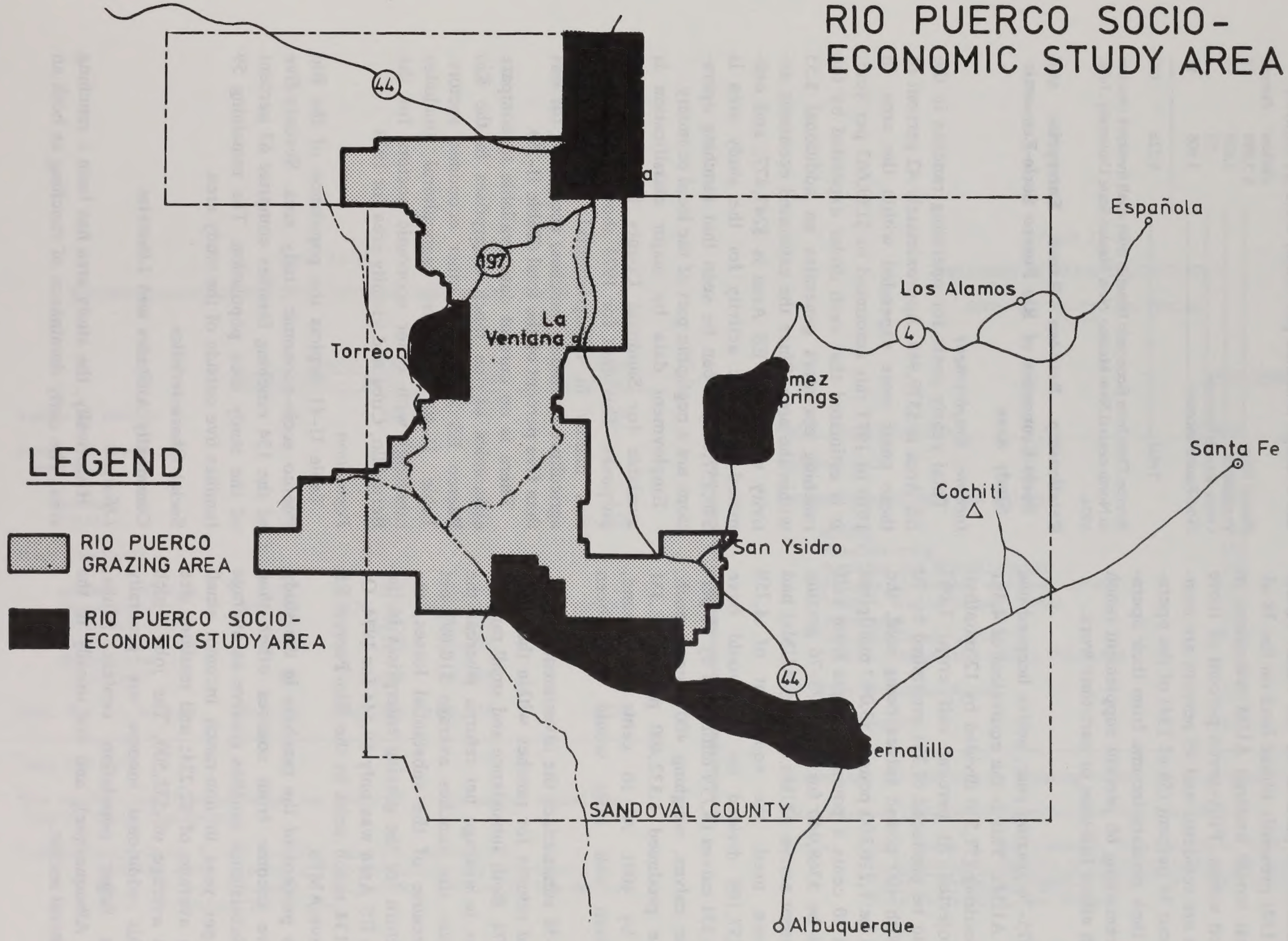


SOURCE: ALBUQUERQUE BLM DISTRICT FILES

TRANSPORTATION

MAP II-13

RIO PUERCO SOCIO-ECONOMIC STUDY AREA



MAP II-14

SOURCES: GRAY AND BURTON, SOCIO-ECONOMIC IMPACTS OF PROPOSED ACTION AND ALTERNATIVES, 1976.

the operators are commuters who maintain their ranches and livestock on an absentee basis during much of the year.

Approximately 50 percent of the ranch operators (66 of 134) presently utilize land on the 38 allotments that would undergo AUM reductions in the proposed action. Fifty-seven percent of these 66 ranchers are residents and 43 percent are commuters. About 34 percent (56 of 134) of the operators derive their primary income from their operations. The remaining 66 percent supplement ranch income with either full-time or part-time work.

Income

In the 1975-76 grazing year, active licensed use was 52,570 AUMs. This is the equivalent of 4,381 livestock yearlong (52,570 divided by 12 months). With a projected 70 percent calf crop, 3,067 calves would be produced (4,381 multiplied by 70 percent). With 400 pound calves being sold, the total would be 1,226,800 pounds (3,067 multiplied by 400). At 30 cents a pound, receipts from calf sales would be $368,040 for the 1975-76 grazing year. If current active AUMs (57,109 AUMs) had actually been used, the equivalent of 4,759 livestock (57,109 divided by 12) would have produced 3,331 calves (4,759 multiplied by 70 percent). These calves, weighing 400 pounds each, would have produced 1,332,400 pounds (3,331 multiplied by 400). At 30 cents per pound, receipts from calf sales would have been $399,720.

Table II-38 summarizes the investments, costs, receipts and returns for ranches within the study area for 1974. Both subsistence and small ranches show losses in average net returns whereas the eight medium size ranches average $10,097 net returns. Because of the substantial losses, the total net return for the grazing enterprises in the Rio Puerco ES Area was only $9,544 for 1974. Of a total of 134 ranch units in the Rio Puerco ES Area, 48 have AMPs.

Fifty-five percent of the ranchers in the study area receive income from sources other than ranching. Subsistence ranches receive an average of $2,906 per year in non-ranch income: small ranches an average of $2,224; and medium size ranches an average of $32,500. The jobs which provide this additional income are generally located in larger population centers (Cuba, Bernalillo, Albuquerque), and are usually in the non-agricultural sector.

For Sandoval County (the Rio Puerco ES Area represents approximately 20 percent of Sandoval County) data is available for 1972 which shows the average incomes per ranch were as follows:

	Dollars	*Percent*
Ranch Sales	$ 3,699	39
Perquisites	1,829	19
Other Ranch Income	93	1
Non-Ranch Income	3,905	41
Total	9,526	100

Source: Data from Economic Benefits from small livestock ranches in North-central New Mexico, New Mexico State University, July, 1974.

Relationship Between Ranch Enterprise and Socio-Economics of Rio Puerco Socio-Economic Study Area

Income: Employment

Total yearly costs for operating ranches in the ES Area is $379,945. Approximately 42 percent of these costs were expended within the area. In 1970 to 1973 this amounted to $159,663 per year. It is estimated that each dollar expended by the ranching operators generates an additional $.55 within the area. Since the estimated economic activity within the ES Area is $247,477, and estimated economic activity for the study area is $40,157,000, it can be seen that ranching operations are a negligible part of the local economy.

Employment data by major classification is available for Sandoval County for comparison purposes. This data for 1973 shows employment was mainly in nonagricultural activities, with agriculture (including ranches) accounting for less than five percent of the total (Table II-39).

There is no current data available to compare economics of the ranch enterprises in the Rio Puerco ES Area with other economic sectors. Table II-40 compares agricultural (includes ranching) with other economic sectors for the Bernalillo, Cuba and vicinity area for 1974.

Population

Table II-41 depicts the population of the Rio Puerco socio-economic study area. Seventy-five of the 134 ranching families comprise 63 percent of the study area population. The remaining 59 families live outside of the study area.

Social Characteristics

Community Attitudes and Lifestyles

Lifestyles

Historically, the study area has been a ranching area. The early dominance of ranching as both an

Table II-38

ECONOMIC SUMMARY OF RECEIPTS, COSTS AND RETURNS PER RANCH[1]

	Ranch Size			Total For Rio Puerco ES Area
	Subsistence	Small	Medium*	
Number of Ranches	84	42	8	134
Number of Livestock Per Ranch				
Average	32	100	355	-
Total	2,816	4,200	2,840	6,208
Items Per Ranch				
Average BLM AUMs	211	621	1,886	-
Investments	$43,777	$175,351	$464,312	$7,729,956
Costs Per Year	1,640	8,403	21,097	379,945
Receipts Per Year	1,529	7,129	31,194	403,277
Net Returns Per Year	- 211	- 1,274	10,097	
Total For All Ranches	-$17,724	-$ 53,508	$ 80,776	$ 9,544

[1] Data for 1974

*One ranch, classified as large, was included in the medium classification to avoid disclosure.

Source: Gray, James R. and Burton C. English, March 1976
Socio-Economic Impacts of Proposed Action and Alternative In the Rio Puerco Allotment. Project No. SP4111-162, New Mexico State University, Las Cruces

Table II-39

EMPLOYMENT BY MAJOR CLASSIFICATION

Sandoval County, New Mexico
1973

Major Classification	Total People Employed Number	Total People Employed Percent of Total[a]
Agricultural	209	4.4
Nonagricultural Wage and Salary	3,855	
Mining	NA[b]	-
Manufacturing	699	14.6
Services and Miscellaneous	858	17.8
Finance, Insurance and Real Estate	521	10.9
Trade - Wholesale and Retail	304	6.3
Government	751	15.6
Contract Construction	635	13.2
Transportation and Public Utilities	87	1.8
All Other Nonagricultural	736	15.3
TOTAL EMPLOYMENT	4,800	100.0

[a] Column may not add due to rounding errors (excluding mining).

[b] NA indicates that the information was not available.

Source: Gray, James R. and Burton C. English, March 1976.
Socio-Economic Impacts of Proposed Action and Alternatives In the Rio Puerco Allotment. Project No. SP4111-162, New Mexico State University, Las Cruces.

Table II-40

ESTIMATED ECONOMIC ACTIVITY

Bernalillo, Cuba and Vicinity[a], New Mexico
1974

Town and Economic Sector	Quantity of Firms	Employment	Gross Output	Value Added	Imports	Exports	Net Exports	Wages
	(number)	(number)	....	.......(thousands	of dollars)	....	....	....
Agriculture:								
Bernalillo	16	23	134	46	45	111	66	125
Cuba and Vicinity	64	76	832	285	283	699	414	412
Mining:								
Bernalillo	2	8	378	242	78	364	286	78
Cuba and Vicinity[b]	2	181	8,552	5,473	1,775	8,227	6,452	1,982
Manufacturing:								
Bernalillo	5	75	1,787	858	678	1,600	922	466
Cuba and Vicinity	3	191	4,559	2,189	271	639	368	1,188
T.C.U.:[c]								
Bernalillo	3	66	1,840	929	1,410	105	-1,305	549
Cuba and Vicinity	8	249	4,907	2,478	3,759	280	-3,479	2,279
Trade:								
Bernalillo	28	129	1,641	1,101	1,053	126	- 927	421
Cuba and Vicinity	39	180	2,285	1,533	1,467	176	-1,291	588
Private Services:								
Bernalillo	18	221	4,951	3,176	3,117	495	-2,622	1,620
Cuba and Vicinity	30	369	8,252	5,295	2,038	825	-1,208	2,705
Public Services:								
Bernalillo	0	269	0	0	0	0	0	1,968
Cuba and Vicinity	0	445	0	0	0	0	0	3,362
Total:								
Bernalillo	72	791	10,731	6,352	6,381	2,801	-3,580	5,227
Cuba and Vicinity	146	1,691	29,426	17,253	9,588	10,846	1,258	12,486
Total Economic Activity	218	2,482	40,157	23,605	15,969	13,647	-2,322	17,713

---

[a] Statistics for the Agricultural Sector include only a portion of the Rio Puerco Area. Also, many of the businesses serving Bernalillo are located in Albuquerque and are not included in this table.

[b] Since 1974, one mine employing 123 people has suspended operations.

[c] Transportation, construction and utilities.

Source: Gray, James R. and Burton C. English, March 1976. Socio-Economic Impacts of Proposed Action and Alternatives In the Rio Puerco Allotment. Project No. SP4111-162, New Mexico State University, Las Cruces.

Table II-41

ESTIMATED POPULATION BY AGE AND SEX FOR THE RIO PUERCO SOCIO-ECONOMIC STUDY AREA

New Mexico, 1970

	Cuba Area						Bernalillo Area								
	ED-8			ED-8B			ED-25			ED-26			Total		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
5	163	158	321	24	24	48	56	54	110	52	67	119	295	303	598
5-6	64	82	146	12	10	22	26	30	56	19	24	43	121	146	267
7-9	101	124	225	15	25	40	46	40	86	35	25	60	197	214	411
10-13	126	131	257	27	25	52	51	44	95	41	39	80	245	239	484
14-16	83	102	185	23	17	40	27	44	71	46	30	76	179	193	372
17-21	144	99	243	29	26	55	52	48	100	52	58	110	277	231	508
22-24	28	45	73	11	7	18	23	28	51	30	24	54	92	104	196
25-34	126	153	279	21	26	47	74	54	128	52	49	101	273	282	555
35-44	117	119	236	21	28	49	57	73	127	34	43	77	226	263	489
45-54	92	92	184	17	21	38	48	50	98	48	45	93	205	208	413
55-61	55	54	109	15	13	28	30	26	56	27	30	57	127	123	250
62-64	13	22	35	4	2	6	12	9	21	7	10	17	36	43	79
65-74	48	38	86	11	7	18	17	19	36	21	24	45	97	88	185
75	20	23	43	3	1	4	11	7	18	16	15	31	50	46	96
Total Population	1,180	1,242	2,422	233	232	465	527	526	1,053	480	483	963	2,420	2,483	4,903

Source: Bureau of Census, Department of Commerce, 1st Census Count Information, 1970, Enumeration Districts 8, 8B, 25 and 26, Sandoval County, New Mexico economic activity and way of life has profoundly affected the economic and social structure. Recently some mineral development has been superimposed on the traditional ranching lifestyle, however, the economic dominance remains ranching and both population and social structure have been affected very little. The present lifestyle is still strongly tied to the land and to self-sufficiency and stability, so characteristic of the ranching culture.

The outdoor life of the ranch appeals to many, both ranchers and non-ranchers, and to people located in the Southwest and throughout the nation. It is particularly appealing because work is located in a clean environment with a low density of population. Often overlooked are the long exhausting hours of physical labor, social isolation during most of the workday (most day to day chores are completed by one man working by himself), outdoor work in foul weather as well as fine, and the possibility of losing enough of the calf crop to disease, drought, theft, nutritional problems, accident, and low prices to wipe out income needed to maintain a family. Also, inexperienced labor, machinery holdups or breakdowns, insect outbreaks, and adverse state and federal legislation may shift the ranch business from the profit to loss side of the ledger. Uncertainty is the rule rather than the exception in a business that depends so heavily on both natural and economic factors, neither of which are controllable.

Attitudes

Because they are tied to the prevailing lifestyle of an area, community attitudes provide an indication of the goals and objectives of a given community. While vital to the planning and the decision making process, information on community attitudes is difficult to obtain. In an attempt to get a measure of the public attitude toward land use in the study area, and the public's expectations regarding the ability to pursue a desired lifestyle, New Mexico State University solicited comments from various groups and organizations in the area.

The study showed that Cuba and the surrounding areas absorbed an estimated 45 percent increase in population from 1970 to 1974. They have done so with a minimum of disruption or deterioration in local quality of life. Generally speaking, Cuba's leaders have been energetic and farsighted in improving and expanding community services, the notable exceptions have been in water and sewage which have been substandard for years.

Over ten groups were contacted to assess attitudes and concerns about past and future developments in the area (New Mexico State University, 1975). Views reflect responses of retirees, students, school administrators, clinic personnel, teachers, industry management, clergymen, ranchers, municipal officials, businessmen and others.

It was not necessary to formally tabulate citizen responses to determine widespread satisfaction with recent developments. Few, perhaps no individuals could be found who opposed development. Nearly everyone saw benefits far outweighing the problems created.

Given their very favorable experience with recent developments, people in the area are quite receptive to new developments. Most favor development on the scale of past events (Ives, 1975). Certainly most want an economically viable and dynamic community.

Currently, more than 90 percent of the permits issued by the Bureau of Land Management for the purpose of grazing in the Rio Puerco ES Area have been issued to Spanish surname ranch operators. For this reason, Spanish-American attitudes, expectations, and realizations are important.

The Spanish-American people believe that land is an integral part of their life (Gray, 1976). An intimate knowledge of and a close sentimental attachment to the land exists. Inheritance customs have resulted in many farms and ranches becoming so small that further division is no longer economically feasible. This can be illustrated in the Rio Puerco ES Area by examining ranch sizes. Eighty-four of the 134 ranches presently having licenses on public lands in the area are of a subsistence nature. Households on these ranches are supported in part by outside income.

Native Spanish-Americans believe that the loss of ancestral agricultural land is closely associated with and perhaps the most important cause of their economic difficulty (Gray, 1976). To Spanish-Americans, government land ownership represents a danger when administrative land utilization programs developed by government agencies do not take their desires and/or needs into consideration.

The study area is currently occupied or used by members of four culture groups; Pueblo Indian, Navajo Indian, Spanish-American and Anglo-American. During public meetings and through other direct contacts with Bureau personnel, members of the Indian and Spanish Speaking groups have discussed their relationships with natural and cultural features of historic, religious and social significance. These relationships are seldom shared with members of other culture groups, and in the case of religious shrines, are only reluctantly revealed because of a fear of potential desecration. In addition to religious values, members of these groups have strong proprietory feelings toward the lands and resources in the study area based on historic and prehistoric occupation by their culture groups. These traditional attitudes are intimately related to livestock management.

According to data gathered through informal conversations with a group of people representing a 24 percent random sample of the impact population, (See BLM Supplementary Reference II-7 in Albuquerque District Office) certain indications of the attitudes and expectations of the group were defined. Contacts were made with ranchers who had operated in the area from as few as two to three years to as many as 48 years. The average person contacted had been involved in ranching in the area for about 30 years. Nearly 82 percent of the persons contacted reported that one or more of their relatives (grandparents, parents, children, or cousins) also were ranch operators.

When asked about apparent changes in the existing environment during the period they had been involved in ranching in the ES Area, only a small minority indicated they knew of any significant changes in aesthetics, employment potentials, or area population growth. Only eight percent felt the area had improved in attractiveness or beauty in the average 30 year period during which they had lived there. In contrast, about 26 percent felt the aesthetic aspects had diminished. Only eighteen percent of the persons contacted in the impact population felt the employment potential had increased in their years of living in the ES Area. On the other hand, 54 percent felt that the opportunity for employment had decreased. Comparably, while thirteen percent of the contacts speculated that the area population had increased, nearly 42 percent were convinced that population had declined. Apparently, due to the opinion that the ES Area had deteriorated aesthetically, and that job opportunities simply were not evident, the people contacted felt that pressures for population increase were not significant.

In contrast to this, however, was a clear indication that those contacted (a representative sample of the impact population) planned to, if possible, continue to ranch. In support of this it was found that although only 44 percent (less than half) of the group felt there would be more opportunities for ranching in the grazing area in the future, an overwhelming 93 percent of the persons indicated: (a) they preferred living on ranches to living elsewhere; (b) they felt their ranch operations would expand in the future; and, (c) they would encourage (and are urging) their children to be ranchers. Evidently, on the basis of the informal discussions with the sample of the impact population, there is a strong tie to, and value orientation toward ranching as a preferred way of life. It can be safely assumed that in this specific situation, and on the basis of the responses, 'ranching' is a social and economic lifestyle that is highly valued, regardless of monetary factors.

It appears that the sample group of the impact population have definite opinions about government (state and federal) intervention in their ranching operations. When people were asked to voice their ideas about taxes, 90 percent indicated they felt federal taxes were a problem; and 80 percent felt state taxes were too high. Sixty-four percent of the people anticipated more state and federal government controls would be imposed in future years, and only 30 percent of those contacted felt such controls would be beneficial to ranching operations. Yet, in contrast to general government controls, those contacted reflected a fairly positive attitude toward the Bureau of Land Management. For example, about 60 percent of the sample group considered BLM as a favorable factor in their ranch operations. About half of the sample group felt they could influence BLM planning decisions. But, some 66 percent of the sample group mentioned that they felt the BLM had not given them as much information as they considered it should regarding its plans and operations.

Obviously, on the basis of these data, the sample groups of the impact population feels a strong taxation burden, and anticipate an increase in state and federal control over their free enterprise ranching operations. On the other hand, they do not, with the exception of what can be described as an information gap, feel ignored or misrepresented by the BLM. But, there is no clear evidence of a significant vote of confidence for the BLM. Careful examination of the percentage figures leads to the conclusion that there are feelings of resentment and opposition to BLM, as well as to an increase in state/federal controls.

In conclusion, the sample group data indicate the impact population (on an average) has operated ranches in the area for two or more generations, does not feel the beauty or attractiveness of the area has improved, and does not feel the ES Area has grown, or will grow in population. They highly value ranch life and ranch work and, although they consider an increase in state/federal controls inevitable, apparently consider BLM to be a government organization with which they have had favorable relations.

DESCRIPTION OF THE FUTURE ENVIRONMENT WITHOUT THE PROPOSED ACTION

Introduction

The following section describes the possible future environment of the Rio Puerco ES Area at the year 2000 if the proposed action is not implemented. Climate and Geologic Setting, which are not expected to change by the year 2000, will not be described again. Resource trends which are described here do not necessarily result from absence of the proposed action.

Air Quality

By the year 2000, air quality in the Rio Puerco ES Area is expected to decrease because of wind erosion and increased mineral activities. There would be increased mineral development by the year 2000. The increase in mining operations by 2000 would inject more dust and other contaminants into the air.

Topography

If the proposed action is not implemented, the conditions responsible for the irregular topographic features would be expected to continue in the Rio Puerco ES Area. These changes could be inconsequential by 2000.

Soils

Areas having Allotment Management Plans (AMPs) would experience increases in vegetative production and would develop relationships between ground cover and soil that favor retention and continued soil development. An increase in soil loss (sedimentation) would be realized where AMPs are not implemented (Table II-42). Soil loss as a result of wind erosion would be evident but losses are difficult to quantify. Critical erosion areas show a potential increase in the future environment (Map II-15). Adverse changes in soil aggregates (flocculation), water/air relationships, and the soil biota would also occur.

Water Resources

Average annual water yields are not expected to change by the year 2000, since they are primarily controlled by climate and geology. Peak runoff rates would increase on areas without AMPs, while decreases are predicted for those areas with implemented AMPs. Failure of many small dams is expected as sediment deposits take the place of water storage capacity. This would be especially true on non-AMP areas due to higher peak flows. The chemical quality of both surface and groundwater should be about the same as now exists.

By the year 2000, average annual withdrawal from groundwater is expected to reach about 80 acre feet, 25 acre feet more than current withdrawal. Increased ground cover on AMP areas should improve the conditions that favor groundwater recharge. Relatively poor ground cover on non-AMP areas would tend to have the opposite effect.

Vegetation

Without the proposal, the vegetation of the Rio Puerco ES Area would improve on the allotments with implemented AMPs. Areas without AMPs would deteriorate from the present condition. (Implemented AMPs will continue, with or without the proposal; therefore, it is necessary to discuss the future of areas with AMPs separately from those without AMPs.) There would be alterations in ground cover, in composition of species making up the ground cover, and in the vigor of the different species. The San Luis Watershed Study, (1972) located in the ES Area, accumulated data on vegetative changes as a response to continuous grazing and summer deferred grazing by livestock. The data recorded are assumed to be similar to what would occur on AMP and non-

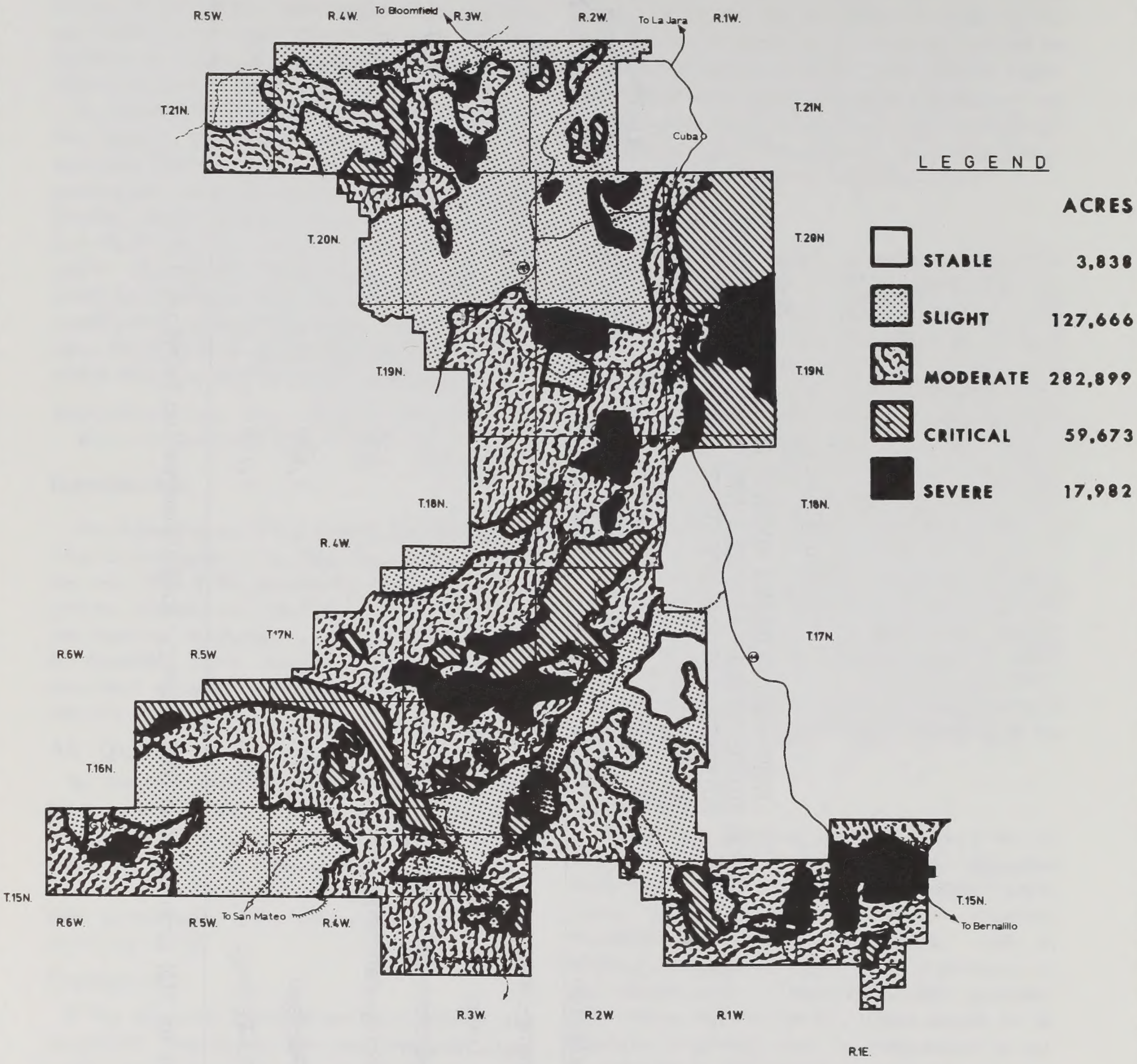
Table II-42

ESTIMATED WEIGHTED AVERAGE SEDIMENT YIELD FROM FUTURE WITHOUT PROPOSED ACTION AT THE YEAR 2000 SOIL ASSOCIATIONS WITHIN RIO PUERCO ES AREA

Soil Association	Area Square Miles	Present Yield tons/sq.mi./year	Yield-Year 2000 Without Proposed Action tons/sq.mi./year
Christianburg-Navajo	50.4	1,530	1,690
Litle-Las Lucas	146.9	1,170	1,280
Penistaja-Berent-Sandstone	138.6	810	810
Basalt Outcrop-Cabezon-Torreon	49.2	630	630
Billings-Persayo	145.9	1,620	2,130
Travessilla-Persayo	268.9	1,170	1,260

Calculated by BLM from Cabezon Soil Survey, Soil Conservation Service, 1971.

ESTIMATED FUTURE EROSION CONDITIONS
RIO PUERCO E.S. AREA



LEGEND

		ACRES
☐	STABLE	3,838
▒	SLIGHT	127,666
▨	MODERATE	282,899
▧	CRITICAL	59,673
■	SEVERE	17,982

SOURCE: PROJECTED FROM 1975 RESOURCE INVENTORY

MAP II-15

AMP areas without implementation of the proposed action. Intensive sampling recorded measurements on ground cover as well as volume of forage produced and utilized over a 20 year period. Appendix I-2 lists data from this study. Table II-43 has been prepared utilizing the San Luis data, the BLM 1975 Resource Inventory, the Range Plant and Range Ecosystem Study by Texas Tech University, and the Rio Puerco Project Study by New Mexico State University. The table gives estimated production of forage in AUMs for vegetative sub-types.

Ground cover decreased under continuous grazing in the San Luis Watershed study. With summer deferred grazing, ground cover increased and then declined over a fourteen year period, but was significantly higher at the end of the study (see Appendix I-2). A shift in dominant grass species from galleta to alkali sacaton occurred over the entire watershed area. It is estimated that neither ground cover nor composition were stable at the conclusion of the study.

The most significant response was the increase in total production which was due to vigor of the plants that were rested during the growing season. The response to the stress of continuous grazing would be similar to the changes predicted on non-AMP areas, and the response to the growing season deferred use would be similar to the changes predicted on allotments with AMPs.

A comparison of aerial photography was done by the Technical Application Center, University of New Mexico using 1938 photos and 1975 aerial photos. Ponderosa pine and pinyon-juniper stands had not appreciably increased in size during 38 years. Quality of the original photos limited determination of other vegetative sub-types. Expansion of these conifer stands is either very slow, or more probably, occurs when infrequent conditions favor establishment.

Table II-44 lists the predicted changes in vegetative ground cover and total vegetative ground cover, for AMP areas and non-AMP areas. The vegetative ground cover is listed for the major vegetative sub-types. Changes in aspect, size, composition and the species which would be affected in each vegetative sub-type have been predicted for areas with and without AMPs.

Areas With Existing AMPs

Ponderosa Pine

The ponderosa pine sub-type would change very little in general aspect or size. The composition of forage plants is expected to change to a co-dominance of Arizona fescue and mountain muhly. A decrease is expected in blue grama, spike muhly, silver lupine, pingue rubberweed and broom snakeweed.

Big Sagebrush

The big sagebrush sub-type would change in aspect to the extent that some areas would become a more open big sagebrush-shortgrass sub-type but other areas would retain big sagebrush as the dominant and climax species. Composition changes in forage plants are expected by increases in western wheatgrass, alkali sacaton, galleta and four-wing saltbush. Blue grama is expected to decrease in the percentage of composition and amount of vegetative ground cover. Broom snakeweed and rabbitbrush are also expected to decrease.

Four-wing Saltbush

The four-wing saltbush sub-type would be expected to increase slightly in size. There would be an increase in western wheatgrass, alkali sacaton and four-wing saltbush. Shadscale, greasewood and rabbitbrush would decrease. Increased vigor of four-wing saltbush would be apparent in the aspect because of increased size of individual plants.

Greasewood

The general aspect and size of the greasewood sub-type is not expected to materially change. Alkali sacaton, western wheatgrass and four-wing saltbush would increase in percent of composition. Greasewood, shadscale and cactus species would decrease.

Shortgrass

The aspect and size of the shortgrass sub-type would not change appreciably except for the improved vigor and increased production. Composition would change with the increase in alkali sacaton, galleta, winterfat and four-wing saltbush. Blue grama, ring muhly, sand dropseed and broom snakeweed would be expected to decrease in percentage of composition.

Table II-43

PREDICTED FORAGE PRODUCTION BY VEGETATIVE SUB-TYPES WITHOUT THE PROPOSAL ON TOTAL ES AREA ACREAGE[1]

Year 2000

Allotments Presently Having AMPs

Vegetative Sub-type	Acres	Production In AUMs[2]
Ponderosa pine	7,738	1,810
Big sagebrush	58,805	13,816
Four-wing saltbush	5,405	409
Greasewood	1,686	335
Shortgrass	36,051	10,373
Broom snakeweed[3]	0	0
Pinyon-juniper	76,531	14,948
Steep and Rocky	2,634	215
Barren	2,463	25
TOTAL	191,313	41,931

Allotments Presently Without AMPs

Vegetative Sub-type	Acres	Production In AUMs[1]
Ponderosa pine	900	74
Big sagebrush	36,340	3,800
Four-wing saltbush	13,023	2,578
Greasewood	7,288	5,006
Shortgrass	117,596	12,464
Broom snakeweed	11,172	1,284
Pinyon-juniper	105,185	8,483
Steep and Rocky	7,802	255
Barren	1,401	13
TOTAL	300,707	33,957

ES Area Total Acres	492,020	75,888
(43 acres cropland)	43	
	492,063	

---

[1] Acres and AUMs are for public lands and all lands used in conjunction with public lands.

[2] AUMs estimated at 50% level of utilization of key forage species for grazing animals.

[3] On allotments with AMPs, broom snakeweed is expected to change to shortgrass aspect by the year 2000.

AMP areas summarized from Table III-8.

Sources: 1975 BLM Resource Inventory
San Luis Watershed Study, Rocky Mountain Forest and Range Experiment Station, Albuquerque Branch
Range Plant and Range Ecosystem Data, Texas Tech University
New Mexico State University

Table II-44

PREDICTED AVERAGE PERCENT VEGETATIVE GROUND COVER CHANGES ON AMP AND NON-AMP AREAS BY MAJOR VEGETATIVE SUB-TYPES

	Ponderosa Pine (North)	Ponderosa Pine (South)	Big Sagebrush	Treated Big Sgebrush	Four-wing Saltbush	Greasewood	Shortgrass	Treated Shortgrass	Broom Snakeweed	Pinyon-juniper	Treated Pinyon-juniper	Steep and Rocky	Barren
PRESENT SITUATION													
Forage Vegetation*	14	8	28	21	31	27	19	21	15	13	21	9	4
Total Vegetation	30	32	31	22	33	27	22	28	31	30	23	13	7
FUTURE, AREAS WITH AMPS													
Forage Vegetation	20	20	30	34	40	30	34	34	Will change to Short-grass	15	25	9	4
Total Vegetation	36	44	35	35	45	32	36	36		32	33	13	7
FUTURE, NON-AMP AREAS													
Forage Vegetation	10	6	18	18	25	15	11	13	11	7	15	9	4
Total Vegetation	28	30	30	30	27	17	16	21	27	24	17	13	7

*Forage Vegetation = Vegetation which is used as forage by grazing animals, and is a portion of total vegetation.

Source: San Luis Watershed Study Data, U.S. Forest Service, 1972
1975 BLM Resource Inventory
Range Plant and Range Ecosystem Data, Texas Tech University, 1976

Broom Snakeweed

The aspect of this sub-type would be expected to change to the shortgrass sub-type. Broom snakeweed would become a minor percent of the composition. There would be an increase in galleta, alkali sacaton, and blue grama. Red three awn and ring muhly would decrease in percentage of composition.

Pinyon-juniper

The general aspect and size of the pinyon-juniper sub-type is not expected to change. Changes in the composition would be by increase of Arizona fescue, June grass and littleseed ricegrass in the higher elevations and galleta and alkali sacaton in the lower elevations. Blue grama and broom snakeweed would decrease in percentage of composition.

Steep and Rocky; Barren

These sub-types would not change appreciably.

Poisonous Plants

Poisonous plants would become less of a problem as the vigor and production of more desirable forage plants increase on AMP areas. This would be especially true of the annuals which are poisonous, as openings where the annuals are common are closed by occupancy of longer lived forage plants. Elsewhere poisonous plants would be less attractive because of the availability of more desirable forage species.

Endangered and Threatened Plants

Data regarding the physiological and phenological characteristics of endangered and threatened plants is limited. Table II-12 (Existing Environment) lists plants which have actually been collected in the area. The sand verbena, *Abronia biglovii*, Heimerl, which was collected near Casa Salazar, was found in an area with a long history of grazing use by domestic animals. The genus does not appear to receive grazing use in other areas, but no information exists for these specific species. Studies will be made (either by BLM staff specialists or by contract) to obtain more information on occurrence, use, and range. Arrow grass, *Triglochin maritima*, L., is a poisonous plant and the Astragalus species belongs to a genus with many poisonous species. Wyethia species are generally unpalatable to cattle. The remaining two species on the list, *Coryphantha missouriensis* (SW) Britt and Rose, and *Salicornia rubra* A. Nels, are among those for which data is lacking.

Areas Without AMPs (Non-AMP Areas)

As shown in Table II-43, areas without AMPs would be at a lower level of production than areas with AMPs if the proposed action is not implemented. There would be a further decline in production and vigor on all major vegetative sub-types.

Ponderosa Pine

The aspect of the ponderosa pine sub-type would not change. There would be an increase in broom snakeweed, rabbitbrush and horsebrush and there would be a decrease in blue grama, Arizona fescue, mountain muhly, June grass and galleta.

Big Sagebrush

There would be little change in the aspect or size of the big sagebrush sub-type, except adjacent to pinyon-juniper stands where a slow invasion of the big sagebrush by pinyon-juniper would occur. The big sagebrush would increase in percentage of composition. Blue grama, broom snakeweed and rabbitbrush would also increase.

Four-wing Saltbush

The aspect would change because of decadent and small four-wing saltbush plants. There would be an increase in broom snakeweed and annuals. Four-wing saltbush and alkali sacaton would decrease in composition percentage.

Greasewood

An increased density of greasewood would change the aspect of the greasewood sub-type and there may be a slight increase in acreage. There would be a decrease in the composition percentage of western wheatgrass and alkali sacaton. Broom snakeweed and rabbitbrush would increase.

Shortgrass

An increase of broom snakeweed, rabbitbrush, cactus species and annuals would change the aspect of the shortgrass sub-type. Alkali sacaton, galleta, western wheatgrass and winterfat would decrease.

Broom Snakeweed

The aspect of the broom snakeweed sub-type would not change appreciably, but the size would increase as shortgrass deteriorated into the broom snakeweed sub-type. Ring muhly and three awns would increase in the existing acreage of the sub-type and galleta and blue grama would decrease.

Pinyon-juniper

The pinyon-juniper sub-type would be expected to increase slightly in size. The aspect would be similar, except for the younger trees on the edges of the stands, where the sub-type would invade big sagebrush or shortgrass. There would be little change in composition except an increase in pingue rubberweed and broom snakeweed.

Steep and Rocky; Barren

These sub-types would not change appreciably.

Poisonous Plants

The most dangerous poisonous plants are those which are most common in the years with good spring moisture, such as tansey mustard, astragalus and larkspur. Late or dry springs result in broom snakeweed poisoning problems. The bulk of the poisonous species are increasers and invaders, when openings in vegetation occur. The non-AMP areas would be expected to have increased amounts of those plants, and therefore, an increased opportunity for livestock death loss because of decreased forage plants.

Endangered or Threatened Plants

The endangered and threatened plant discussion previously made under the AMP section also applies to the non-AMP areas.

Range condition classes for the future without the proposal are discussed in Chapter III, Vegetation.

Wildlife

Changes in vegetation would affect wildlife and their habitat as follows: (1) overall wildlife abundance of most species occupying the Rio Puerco ES Area, particularly big game animals, would decline, and (2) some species could disappear from the area. It is possible, however, that a few species of birds and small mammals would maintain their present populations or even increase in numbers.

Big game animals are expected to decline in all but a few locations in the area due to a continuing competition for forage among livestock, elk, deer, and antelope. For example, elk and deer populations would decline by an estimated 30 elk and 250 deer by the year 2000, in all areas except La Ventana and the Continental Divide. Winter use by both species in the La Ventana area, under existing AMPs, should increase by approximately 12 elk and 70 deer. Deer herds in the Continental Divide area, although under AMPs, would probably maintain their existing populations. Among the other big game species of the area, antelope populations would decline by 25 to 35 animals; black bear and mountain lions would probably disappear from the area.

Ranges for various game species are expected to gradually deteriorate. Ten percent of deer winter range would decrease from good to fair and 20 percent would decrease from fair to poor. In elk winter range 10 percent would decrease from good to fair while 15 percent would decrease from fair to poor. Antelope yearlong range would also deteriorate with 10 percent decreasing from good to fair and 20 percent from fair to poor.

Game birds would also have population reductions, although the overall effects would be somewhat less drastic than those encountered by big game species. Among the game birds of the area, turkeys are in the greatest danger of serious population reduction. The existing flock of 50 to 75 birds may decline to less than 25. The species may disappear from the area entirely. Like the turkey, scaled quail also occupy marginal habitat, most of which has been declining. The species' numbers would also be reduced in the ES Area. The existing use by mourning doves is not expected to change. In like manner, the present occasional use of the area by waterfowl is not expected to change.

Three furbearers, the badger, kit fox, and gray fox, would probably expand in numbers as a result of increased rodent populations. Coyote populations are expected to remain stable while raptors are expected to increase at least 10 percent. It is expected that some bobcat habitat would be destroyed by mineral exploration and development. The populations of the remaining furbearers of the area, raccoons, ringtailed cats, and skunks, would probably remain stable or decline.

Continued yearlong grazing by livestock reduces the vegetation selected by the grazing animals (Hormay 1970) and allows the pastures to become invaded by brush and shrubs (USDI 1975). It is reasonable to conclude, therefore, that the pastures not covered by Allotment Management Plans would be dominated with such plant species as broom snakeweed, Russian thistle, rabbitbrush, greasewood, and pinyon-juniper. This increase in brushy cover would result in more pinyon mice, deer mice, kangaroo rats, pocket gophers, prairie dogs, and rabbits. Such conclusions are substantiated by numerous studies, including Quast (1954) in California, Phillips (1936) in Oklahoma, and Norris (1950) in New Mexico. This increase in small mammal populations would, in turn, influence coyote and raptoral bird numbers.

Shortgrass bird species, such as meadowlarks, horned larks, and nighthawks, would decline in numbers, while those species preferring more brushy habitats (vesper sparrow, sage thrasher, western bluebirds, and pinyon jays) would increase in numbers. The overall effect on total numbers of birds in the area would be minimal since the decline in shortgrass species would be compensated by the increase in birds preferring more brushy habitat. However, the total number of species now found in the area would probably decline.

Current literature offers little data on the effects of livestock grazing programs on reptile and amphibian communities. However, there is no indication that existing populations would change as a result of grazing or any other factor.

Increasing demands on fishing as a form of recreation may result in attempts to stock the area's more permanent stock tanks and reservoirs. These waters are not capable of withstanding heavy fishing pressures under natural conditions, however, and would require frequent restocking in order to provide a successful fishery.

Few reports are available on the relationships between invertebrates and grazing; however, vegetative changes would probably influence species composition.

Vegetation plays an important role in both distribution and numbers of arthropods beyond that of providing a source of food. Shortgrass species such as prairie centipedes, mantids, and some species of grasshoppers would probably decline, while aphids, leaf-hoppers, long-legged flies, and sawflies would probably increase.

Vegetation height, density and composition all affect arthropod density. A number of studies have recognized the detriment or benefit to various arthropod species related to livestock grazing of differing intensities. Pepper (1955) reported that almost without exception, high population densities of grasshoppers occur in areas with excessive livestock grazing, or with a combination of heavy grazing and dry weather. Overgrazing causes many insect species to decline or disappear, but it can enable grasshoppers to increase enormously.

Studies on the International Biological Program Grassland Biome (1971) revealed consistently greater number of arthropods throughout the season in the permanently ungrazed plots. These data are consistent with those of Morris (1967) who found that most taxonomic groups he sampled were most common in areas left ungrazed for two to three years. Lightly grazed plots supported greater numbers of arthropods than did moderately or heavily grazed plots; light grazing of pastures resulted in a build-up of *Homoptera* (plant sucking insects) which was maintained throughout the season; and ants were found in smallest numbers in the heavily grazed pasture (Lavigne, et al, 1972).

Cultural Resources

The future of cultural resources in the area can be assessed from research potential and physical condition of the various cultural properties.

Research Potential

Based on current research programs, it is expected that the area would be important for research of the following topics through the year 2000.

1. Regional Settlement Pattern Analysis
2. Ethnobotanical Studies
3. Paleoenvironmental Studies
4. Historical Studies of Spanish, Navajo, and Anglo Use and Occupation of the Area
5. Cultural History and Paleoecological Studies of the Pueblo Period Occupation
6. Cultural History and Paleoecological Studies of the Gallina Occupation
7. Subsistence and other Resource Uses of the Area by Early Hunters and Gatherers (Paleo-Indian and Archaic Periods)
8. Social and Economic Studies of Land Uses in Semi-arid Lands

Any modification in the extent of research interest in the area would result from a deterioration of the data base or a major change in the theory or methodology of the disciplines that study cultural resources. It is expected that improvements of experimental dating techniques of thermo-luminescence and obsidian hydration would significantly enhance the research possibilities of the ES Area. The effects of these improvements would be to provide dates for the many sites whose cultural period cannot now be determined. Such developments in temporal control would enhance all research directed at the prehistoric period.

Changes in the Cultural Resource Data Base

As noted in the discussion of the existing environment, the sample survey results imply that the majority of cultural resources are in poor condition. Cultural resources are nonrenewable, and their condition is not readily enhanced. The trend in cultural resource condition is expected to be continued deterioration due to erosion, land use projects, and vandalism. Quantitative measures are not available for this trend. However, the nature of influence of these three sources of deterioration can be anticipated in general terms.

Erosion

Without the proposed action, erosion is expected to continue in the area, affecting primarily the environmental zones of greatest cultural resource density. The extent of erosion is discussed in the future environment of Soils. No model exists which can relate the predicted effects on soils to quantitative effects on cultural resources, but it is expected that surface sites (campsites and special activity areas) would be disturbed through vertical and lateral displacement of cultural materials and the destruction of paleoenvironmental information. The magnitude of this effect must be considered in light of the general poor condition of the cultural resource base. Continued deterioration can lead only to significant numbers of sites being destroyed.

Land Use Projects

Independent of the proposed action, there would be a significant increase of surface-disturbing projects resulting from energy and mineral development. Some of these projects would be subject to environmental restraints including protection measures for cultural resources. It is expected, however, where cultural resource protection objectives and proposed energy development goals conflict, that energy development would proceed with the loss of the cultural resource. This loss may be mitigated in some cases by scientific study. The net effect would be a reduction in the number or cultural resources, restricting the possibilities of regional cultural research.

Vandalism

Currently, vandalism is estimated to be the least significant of the sources of cultural resource deterioration. The low level of vandalism is probably attributable to the limited numbers of people in the area. With the increase of population expected in the future and the increased access to cultural resources through mineral exploration activities, vandalism is expected to increase. If the pattern of vandalism now seen in the area is continued, the major losses would be seen at the habitation sites of Pueblo, Navajo, and Spanish origins.

Paleontology

If the proposed action is not implemented, there would be no significant change in the paleontological resources in the area.

Visual Resources

The landscape character of the area would not significantly change without the proposed action. The existing canyon-cut plateaus, lava-capped mesas and rolling to flat plains with generally sparse vegetation would continue to characterize the remote, natural quality of the landscape. Mining and geothermal activities would alter the topography around the area of operations.

Vegetation and erosion control are predicted to increase on the 21 allotments with AMPs and decline on the remaining allotments. If continuous grazing is practiced on the non-AMP allotments, a gradual reduction in ground cover would occur and bank and channel erosion of the Rio Puerco and tributaries would cause unsightly scars on the landscape. These modifications would affect the form, line, color and texture of the existing landscape by disturbing the soil, removing the vegetation and placing structures on the landscape.

The scenic quality evaluation scores for the future environment can be expected to drop on five of the eight rating areas. This would change the scenic quality class from B to C in areas 005 and 006, La Ventana Mesa West and East respectively (see Existing Environment). The main contributing factor would be the reduction in quality of vegetation.

Visual sensitivity levels are not expected to change from those designated for the existing environment. Areas of high sensitivity would probably receive a higher score due to increased traffic volume.

As a result of the scenic quality changing from Class B to Class C in rating areas 005 and 006, the final VRM class in these areas would change from II to III. Also, the southwestern tip of area 005, La Ventana Mesa West would change from Class III to Class IV (refer to Map II-16).

Recreation

Without implementation of the proposed action, the recreation resources within the area would deteriorate although actual recreation use would increase.

It is predicted that recreation use would increase as follows:

Activity	Visitor Use Days	
	Current	Year 2000
Off Road Vehicles	170,000	191,000
Sightseeing	324,000	433,000
Primitive/Natural Values	4,000	7,000
Hunting Use	46,000	62,000

Visitor use information was compiled by BLM utilizing the 1976 Statewide Comprehensive Outdoor Recreation Plan (SCORP).

Hunter success would continue at its present low level and possibly decrease further without the proposed action. Continued loss of vegetation and wildlife habitat through erosion would decrease the number of big game species presently in the Rio Puerco ES Area.

Livestock

The future environment without the proposal would result in the continuation of the grazing systems on the 21 implemented AMPs. The present level of minimum management would also continue on the six non-implemented AMPs and 69 non-AMP allotments.

The AMP allotments are expected to continue increasing in forage production. AUM production on the AMP allotments is estimated to increase to a total of 35,526 AUMs by the year 2000 (14,664 AUM increase). Conversely, forage production on the non-implemented AMPs and non-AMP allotments is expected to continue to decline due to the present level of management. Forage production on the non-AMP and non-implemented AMP allotments is estimated to decrease to a total of 21,985 AUMs by the year 2000 (14,262 AUM decrease).

Overall, total projected forage production, including both AMP and non-AMP allotments, would increase 402 AUMs by the year 2000.

Refer to Table II-45 for allotment comparisons of current active AUMs versus projected AUMs without the proposal.

Without the proposal, livestock management practices presently utilized (i.e., breeds of livestock, cow/calf operations, breeding practices, season of use, weaning/shipping dates, culling practices, supplemental feeding, etc.) would be virtually unchanged.

Mineral Resources

If the proposed action is not approved, mineral resource development in the area probably would not be affected. Gypsum production would continue in slightly increased amounts through the year 2000.

Development of coal deposits in the area could occur within ten to fifteen years. Increased production of oil, gas, and initiation of geothermal energy and uranium mining could occur within the next five to fifteen years. More exploratory work would be performed for these resources. The areas from which salable minerals (e.g. sand and gravel) are removed are generally less than ten or fifteen acres in size and would not be affected by reduced forage.

Forestry

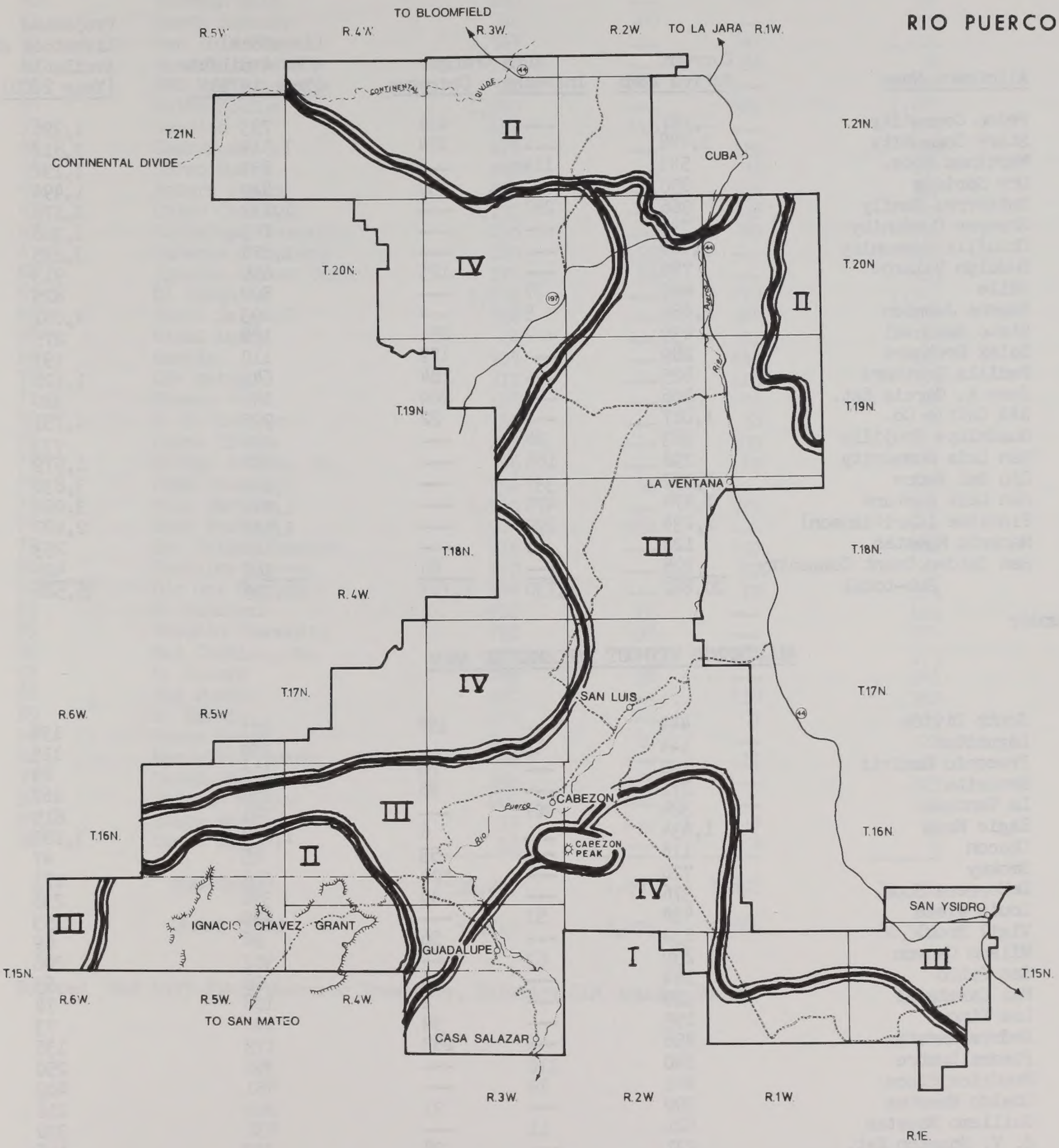
Forty-seven percent of the forested (ponderosa pine) lands in the ES Area occur in the area covered by existing AMPs. The remaining 53 percent of the forested lands are located primarily in the western and southeastern portion of the Ignacio Chavez Grant on Mesa Chivato and its associated slopes and canyons.

Assuming that the existing AMPs would be evaluated and revised accordingly within the next few years, there would not be any significant change in the forestry resource. A general improvement in range management practices would possibly result in a small reduction in livestock associated damage to the forestry resource.

The forested lands not contained within existing AMP areas would follow a trend similar to what is occurring in the existing environment. Livestock damages, such as trampling and browsing, would continue at the same or an increasing rate which may result in a lower timber

VISUAL RESOURCE MANAGEMENT CLASSES

RIO PUERCO E.S. AREA



SOURCE: RIO PUERCO UNIT RESOURCE ANALYSIS

VRM CLASSES FOR FUTURE ENVIRONMENT WITHOUT PROPOSED ACTION.

MAP II-16

TABLE II-45

ANTICIPATED GRAZING USE
CURRENT, AVAILABLE AND PROJECTED ON PUBLIC LANDS

ALLOTMENTS WITH IMPLEMENTED AMPs

Allotment Number	Allotment Name	Current Active AUMs	AUMs Change Increase	AUMs Change Decrease	Livestock AUMs Available (Year 1975)	Projected Livestock AUMs Available (Year 2000)
1	Pelon Community	1,197	---	404	793	1,396
2	Starr Community	1,788	---	274	1,514	2,812
3	Martinez Bros.	543	114	---	657	1,192
4	Dry Springs	850	---	30	820	1,496
5	Gutierrez Family	966	267	---	1,233	2,178
7	Shroyer Community	743	---	---	743	1,308
8	Chiuilla Community	1,828	---	---	1,828	3,235
9	Rudolph Velarde	780	---	125	655	913
10	Valle	480	27	---	507	825
11	Eugene Johnson	2,688	5	---	2,693	4,051
16	Sisto Sandoval	439	---	251	188	275
18	Salaz Brothers	289	---	179	110	197
34	Padilla Brothers	825	---	184	641	1,128
38*	Jose A. Garcia Est.	406	---	264	142	320
39	A&A Cattle Co.	1,017	---	22	995	1,751
41*	Guadalupe Trujillo	383	96	---	479	733
53	San Luis Community	792	105	---	897	1,579
66	Ojo del Padre	1,792	337	---	2,129	3,830
77	San Luis Pasture	1,474	475	---	1,949	3,092
80	Pipeline (Chritianson)	1,234	299	---	1,533	2,497
84	Macario Maestas	120	5	---	125	253
91	San Ysidro Grant Community	228	---	60	168	425
	Sub-total	20,862	1,730	1,793	20,799	35,526

* Managed under one AMP

ALLOTMENTS WITHOUT IMPLEMENTED AMPs

6	South Divide	444	---	167	277	194
12	Lagunitas	144	15	---	159	115
13	Procopio Ramiriz	192	---	76	116	84
14	Senorita	271	---	86	185	167
15	La Ventana	324	407	---	731	615
17	Eagle Mesa	1,634	---	6	1,628	1,189
19	Chacon	118	---	53	65	47
20	Smokey	720	---	504	216	173
21	DeHerrera Bros.	376	---	46	330	238
22	Louis Wiese	438	51	---	489	353
23	Vigil Bros.	152	---	56	96	69
24	Wilson Canyon	239	63	---	302	208
25	San Pablo	144	---	78	66	53
26	Max Carabajal	110	---	2	108	78
27	Los Pinos	195	---	94	101	73
28	Andres Maestas	456	---	283	173	135
29	Piedra Lumbre	240	110	---	350	250
30	Brodrick Place	441	10	---	451	402
31	Ubaldo Maestas	300	---	91	209	218
32	Guillemo Maestas	421	11	---	432	330
33	S. V. Houston Est.	231	---	28	203	146
35	Elk Springs	132	36	---	168	121
36	S. Casaus	367	---	168	199	144
37	Manuel Montoya	620	---	102	518	381
40	Marquez & Barboa	35	---	35	0	0
42	Ignacio Velarde Est.	300	---	182	118	79
43	G. Montoya	12	---	12	0	0
44	Juan Maestas	48	---	16	32	28
45	John Segura	12	---	12	0	0
46	Hack Wiseman	2,796	---	663	2,133	1,542
47	Cebo Community	1,135	173	---	1,308	945

Table II-45 (continued)

ALLOTMENTS WITHOUT IMPLEMENTED AMPs

Allotment Number	Allotment Name	Current Active AUMs	AUMs Change Increase	AUMs Change Decrease	Livestock AUMs Available (Year 1975)	Projected Livestock AUMs Available (Year 2000)
48	Ed Lovato	1,164	---	545	619	447
49	San Luis Mesa	268	---	139	129	93
50	Torreon Wash	642	---	48	594	329
51	North Pasture	240	69	---	309	174
52	San Luis Place	1,567	---	341	1,226	873
54	Aparcio Lovato	180	---	96	84	60
55	M&S Montoya Grant	360	37	---	397	323
56	Keith Elkins	1,909	---	621	1,288	924
57	Seccion	678	115	---	793	579
58	Empedrado	428	---	129	299	216
59	Cerro Cuate	488	---	76	412	298
60	Robert Taylor	486	---	184	302	219
61	Chico Crossing	2,131	---	576	1,555	1,124
62	Guadalupe Community	696	---	80	616	432
63	Cabezon Community	625	97	---	722	426
64	Ignacio Chavez Grant	576	29	---	605	437
65	El Banquito	1,836	---	273	1,563	1,202
67	Cerro Salado	396	---	164	232	140
68	Vidal Loddy	24	---	11	13	9
69	Garcia	904	---	444	460	332
70	C&R Griego	377	---	116	261	193
71	Romero Bros.	108	---	46	62	50
72	E. B. Sanchez	84	---	38	46	30
73	Cerro Tinaja	205	---	103	102	74
74	Elfego Aranda, Jr.	96	---	19	77	59
75	Casa Salazar	156	12	---	168	113
76	Pula Pasture	1,380	---	579	801	579
78	Aker Pasture	504	234	---	738	532
79	San Ysidro Pasture	876	---	132	744	537
81	Corrales Tierra	120	---	52	68	50
82	Ojo del Espiritu	246	---	73	173	125
83	F. Sandoval	408	12	---	420	303
85	Tenorio Community	778	198	---	976	725
86	Max Tachias, Sr.	173	---	---	173	125
87	D. Lucero	288	59	---	347	231
88	Zia Pueblo	480	---	218	262	190
89	B. Garcia	272	---	7	265	191
90	Henry Perea	181	39	---	220	132
92	Manuelita Garcia	48	---	11	37	26
93	Fermin Marquez	191	24	---	215	155
94	Sifredo Romero	600	---	---	600	434
95	State Section	19	---	7	12	10
96	Canon Tapia	12	---	4	8	7
	Sub-Total	36,247	1,801	7,892	30,156	21,985
	Grand Total	57,109	3,676	9,784	50,955	57,511

Source: BLM 1975 Field Resource Inventory, Existing BLM Grazing Files volume yield in future harvests. Since the current harvest levels are minimal and there are no industries totally dependent upon this volume, there would not be a noticeable impact on the forest industry.

Future harvest levels as affected by grazing would not be altered by the year 2000. The woodlands (pinyon-juniper) would increase in size and demand for firewood would increase. Grazing use would not affect this demand.

Transportation Networks

If the proposed action is not implemented, there would be little or no change in the transportation system due to grazing. However, assuming that by the year 2000 recreation and mining activities in the Rio Puerco ES Area would increase, then the transportation networks into these areas would be improved and better maintained. There is a possibility that either State Road 297, running through San Luis, Guadalupe, and the Ignacio Chavez Grant, or the pipeline road passing through the southern part of the ES Area toward Farmington may be paved or improved with gravel by the year 2000.

Socio-Economics

Number of Ranches

If the proposed action is not implemented, the total number of ranches in the Rio Puerco ES Area would be expected to decrease from 134 to 119. See Table II-46 for comparison between allotments with and without AMPs.

Income: Employment

Allotments with AMPs would receive a total increase of 14,664 AUMs which is equivalent to 1,222 livestock (14,664 divided by 12). With a 90 percent calf crop, this livestock would produce 1,100 calves (1,222 multiplied by 90 percent). Assuming the calves weigh 430 pounds each, the total would be 473,000 pounds (1,100 multiplied by 430). At a projected price of 92.4 cents per pound, receipts from calf sales at the year 2000 would be $437,052 on areas with AMPs.

Allotments without AMPs would receive a total decrease of 14,262 AUMs which is the equivalent of 1,189 livestock (14,262 divided by 12). With an 80 percent calf crop, this livestock would produce 951 calves (1,189 multiplied by 80 percent). Assuming the calves weigh 400 pounds each, the total would be 380,400 pounds (951 multiplied by 400). At a projected price of 92.4 cents per pound, receipts from calf sales at the year 2000 would be $351,490 on areas without AMPs. Total receipts from the sale of calves at the year 2000 would be $788,542.

Employment in the agricultural (ranch) sector of the economy in the Rio Puerco ES Area would decrease by 11. This represents a change from 99 employed in agriculture now to 88 employed in agriculture in the year 2000. Table II-47 compares the economic activity at the year 2000 for the Rio Puerco ES Area.

Population Change

There would be an increase in population in the Rio Puerco ES Area related to development of coal, geothermal steam or uranium on or adjacent to the area.

Table II-46

CHANGES IN NUMBER OF RANCHES BY SIZE FOR RANCHES WITH AND WITHOUT AMPs BY THE YEAR 2000

Ranch Size	Currently Existing	Year 2000 With AMPs	Year 2000 Without AMPs	Year 2000 Total by Size
Subsistence	84	23	66	89
Small	42	17	3	20
Medium	8	6	2	8
Large	None*	2	None	2
SUBTOTAL		48	71	
TOTAL	134			119

Source: English and Gray, Socio-Economic Impacts of Proposed Action and Alternatives in the Rio Puerco Allotment, 1976

* See Table II-38 for explanation.

Table II-47

ESTIMATFD ECONOMIC ACTIVITY FOR THE FUTURE WITHOUT THE PROPOSED ACTION RIO PUERCO ES AREA

Year 2000

Major Economic Activity	Quantity of Firms	Employment	Gross Output	Value Added	Imports	Exports	Net Exports	Wages
	(number)	(number)	..................(thousands of dollars)..................					
Agriculture	71	88	2,183	748	742	1,829	1,187	1,078
Mining	3	13	1,262	807	261	1,215	954	280
Manufacturing	16	432	28,684	13,768	4,277	10,114	5,837	3,308
T.C.U.[a]	16	452	22,382	11,280	17,144	1,276	-15,868	9,348
Trade	206	1,045	30,245	20,292	19,413	2,326	-17,087	7,710
Private Services	146	2,005	101,161	64,903	40,648	10,113	-30,535	40,090
Public Services	0	2,410	0	0	0	0	0	40,786
TOTAL	458	6,555	185,917	111,798	82,485	26,873	-55,612	102,000

[a] Transportation, construction and utilities.

Source: English and Gray, Socio-Economic Impacts of Proposed Action and Alternatives in the Rio Puerco Allotment, 1976.

Chapter III

The Environmental Impacts of the Proposed Action

CHAPTER III

THE ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Introduction

The impacts which would arise from implementation of the proposed action are described in Chapter III. Each resource is analyzed according to the four major sources of impacts included in the proposed action:

1. Rest and Deferred Rotation Grazing Systems
2. Construction and Physical Presence of Range Improvement Projects (Range improvements would be located throughout the ES Area.)
3. Vegetative Manipulation
4. Ungrazed Allotments

Impacts arising from utilization of range improvement projects by livestock are included in source of impact 1 rather than 2. If a resource is not affected by a particular source of impact, no discussion is included. Climate, Geologic Setting, Topography and Mineral Resources which are not expected to change as a result of the proposed action, will not be discussed again. Most impacts are initiated in Soils and Vegetation and for continuity, these sections should be read first.

Chapter I discusses details of the proposed action which would cause impacts. Short-term impacts are those expected to last less than five years; whereas, long-term impacts are those which would still be evident in the year 2000. Localized impacts are those restricted to the immediate vicinity of the action discussed, although actual distance varies according to the resource. Area-wide impacts refer to the entire ES Area unless otherwise specified. To aid in tracking impacts through remaining chapters, impacts have been numbered consecutively throughout this chapter. Table III-1 summarizes these numbered impacts by resource. In addition, Table III-1 displays: (1) whether the impact is partially or totally mitigated in Chapter IV and (2) whether the impact (or part of the impact) is analyzed as an unavoidable adverse impact in Chapter V. (Only major adverse impacts are analyzed as unavoidable.) Table III-2 summarizes the impacts by allotments and Table III-3 lists acreage data used in analyzing impacts. Appendix III-1 correlates impacts between resources.

Air Quality

Source of Impacts: Rest and Deferred Rotation Grazing Systems

1. SMOKE

Increased vegetative production resulting from the rest and deferred rotation grazing systems would cause a long-term increase in vegetative production and litter in the ES Area and would thereby create a receptive environment for wildfire to start and spread (see Vegetation, Impact 22, 'Increased Forage Production'). Wildfires may not increase above the current three fires per year, but increased vegetative litter would cause these fires to spread more rapidly and consume more acreage prior to initiation of standard fire supression activities. Over the last nine years (1968–1976), these wildfires involved less than 85 acres. The threat of fire varies between each vegetative sub-type. Grasslands would burn and spread faster than woodland types, although woodlands would produce darker smoke because of the heavier fuels. In the past, most fires have occurred in the pinyon-juniper sub-type. Smoke would cause a localized decrease in air quality. This impact would be short-term during each fire but the propensity for larger wildfires would be long-term.

2. LESS WIND EROSION

Improved vegetative production would cause a long-term decrease in ambient dust particles. Wind erosion losses are relatively greater on allotments occurring in the Penistaja-Berent-Sandstone soil association (86,675 acres) due to sandy surface textures. See Visual B for location of soil associations. These losses are difficult to quantify; no wind erosion studies were made in the Rio Puerco ES Area. Less wind erosion would be a beneficial long-term impact.

Source of Impacts: Construction and Physical Presence of Range Improvement Projects

3. INCREASED WIND EROSION

Construction of range improvement projects would cause a localized, short-term disturbance of 1,069 surface acres; 85 of these acres would remain in use as a long-term impact (see Table III-3). All soil associations would incur localized soil disturbance from improvement projects; however, Penistaja-Berent-Sandstone would be most

TABLE III-1
SUMMARY OF ANTICIPATED IMPACTS BY RESOURCE
Proposed Action

Resource	Source of Impact	Impact	Magnitude of Impact		Mitigating Measures (Chapter IV)	Unavoidable Adverse Impact (Chapter V)
Air Quality	Grazing Systems	1. Smoke (from wildfires)	Localized long-term	-	No	No
		2 Less Wind Erosion	Area-wide long-term	+	No	No
	Project Construction	3. Increased Wind Erosion	Localized long-term	-	No	No
	Vegetative Manipulation	4. Increased Smoke (sagebrush burning)	Localized short-term	-	No	No
		5. Increased Wind Erosion	Localized short-term	-	No	No
Soils	Grazing Systems	6. Less Wind Erosion	Area-wide long-term	+	No	No
		7. Less Water Erosion	Area-wide long-term	+	No	No
		8. Increased Water Erosion	Localized short-term	-	No	No
		9. Increased Water Retention	Area-wide long-term	+	No	No
	Project Construction	10. Soil Disturbance	Localized long-term	-	No	Yes
		11. Increased Erosion	Localized long-term	-	Yes	Yes
	Vegetative Manipulation	12. Soil Disturbance	Localized long-term	+	No	No
		13. Increased Erosion	Localized short-term	-	No	No
Water Resources	Grazing Systems	14. Decreased Runoff	Area-wide long-term	+	No	No
		15. Increased Water Retention	Area-wide long-term	+	No	No
		16. Less Water Available for Reservoirs	Localized long-term	-	No	Yes
		17. Improved Water Quality	Area-wide long-term	+	No	No
		18. Increased Groundwater Withdrawal	Area-wide long-term	-	Yes	No
	Project Construction	19. Increased Water Erosion	Localized long-term	-	No	No
	Vegetative Manipulation	20. Increased Water Erosion	Localized short-term	-	No	No

(Continued)

Table III-1 (continued)

Page 2 of 5 Pages

Resource	Source of Impact	Impact	Magnitude of Impact		Mitigating Measures (Chapter IV)	Unavoidable Adverse Impact (Chapter V)
Vegetation	Grazing Systems	21. Improved Vegetative Vigor	Area-wide long-term	+	No	No
		22. Increased Forage Production	Area-wide long-term	+	No	No
		23. Increased Total Ground Cover	Area-wide long-term	+	No	No
		24. Improved Range Condition	Area-wide long-term	+	No	No
		25. Increased Wildfires	Localized long-term	-	No	Yes
		26. Increased Riparian Vegetation	Localized long-term	+	No	No
		27. Increased Water Retention	Area-wide long-term	+	No	No
		28. Improved Water Quality	Area-wide long-term	+	No	No
		29. Less Erosion	Area-wide long-term	+	No	No
		30. Decreased Vigor	Area-wide short-term	-	No	No
	Project Construction	31. Removal of Vegetation	Localized long-term	-	No	No
	Vegetative Manipulation	32. Conversion of Vegetative Sub-types	Localized long-term	+	No	No
		33. Alteration of Threatened & Endangered Plants	Area-wide long-term	-	Yes	No
Wildlife Aquatic Habitat	Grazing System	34. Increased Waterfowl Use	Area-wide long-term	+	No	No
		35. Improved Water Quality	Localized long-term	+	No	No
		36. Saline Water	Localized long-term	-	Yes	No
Terrestrial Habitat Big Game		37. Decreased Competition	Area-wide long-term	+	No	No
		38. Forage Reservation	Area-wide long-term	+	No	No
		39. Increased Wildfires	Localized long-term	+	No	No
		40. Saline Water	Localized long-term	-	Yes	No
		41. Improved Water Quality	Area-wide long-term	+	No	No
	Project Construction	42. Fences	Localized long-term	-	No	No
		43. Water Development	Localized long-term	+	No	No
		44. Attraction of Predators	Localized long-term	-	No	No

(Continued)

Table III-1 (continued)

Page 3 of 5 Pages

Resource	Source of Impact	Impact	Magnitude of Impact		Mitigating Measures (Chapter IV)	Unavoidable Adverse Impact (Chapter V)
Terrestrial Habitat (continued)	Vegetative Manipulation	45. Habitat Conversion	Localized long-term	+-	No	Yes
	Ungrazed Allotments	46. Forage Reservations	Localized long-term	+	No	No
Birds	Grazing Systems	47. Improved Habitat	Area-wide long-term	+	No	No
		48. Habitat Destruction	Area-wide long-term	-	No	No
		49. Increased Wildfires	Localized long-term	-	No	No
		50. Saline Water	Localized long-term	-	Yes	No
		51. Improved Water Quality	Area-wide long-term	+	No	No
		52. Water Development	Area-wide long-term	+	No	No
		53. Attraction of Predators	Localized long-term	-	No	No
		54. Attraction of Insects	Area-wide long-term	+	No	No
	Vegetative Manipulation	55. Habitat Conversion	Localized long-term	+-	No	Yes
		56. Increased Seed Production	Area-wide long-term	+	No	No
Turkey	All Sources	57. Improved Habitat	Localized long-term	+	No	No
Raptors	All Sources Except Project Construction	58. Improved Raptor Habitat	Area-wide long-term	+	No	No
Raptors	Project Construction	59. Perches	Localized long-term	+	No	No
Small Mammals	Grazing Systems	60. Improved Habitat	Area-wide long-term	+	No	No
		61. Habitat Reduction	Localized long-term	-	No	No
		62. Increased Wildfires	Localized long-term	+	No	No
		63. Saline Water	Localized long-term	-	Yes	No
		64. Improved Water Quality	Area-wide long-term	+	No	No
	Project Construction	65. Habitat Destruction	Localized long-term	-	No	No
		66. Attraction of Predators	Localized long-term	-	No	No
		67. Water Development	Area-wide long-term	+	No	No
	Vegetative Manipulation	68. Habitat Conversion	Localized long-term	+	No	No

(Continued)

Table III-1 (continued)

Page 4 of 5 Pages

Resource	Source of Impact	Impact	Magnitude of Impact		Mitigating Measures (Chapter IV)	Unavoidable Adverse Impact (Chapter V)
Arthropods	Grazing Systems	69. Increased Diversity	Area-wide long-term	+	No	No
	Vegetative Manipulation	70. Habitat Conversion	Localized short-term	+-	No	No
Cultural Resources	Grazing Systems	71. Increased Wildfires	Area-wide long-term	-	No	Yes
		72. Disturbance by Livestock	Area-wide long-term	-	Yes	Yes
		73. Less Soil Erosion	Area-wide long-term	+	No	No
	Project Construction	74. Disturbance by Project Construction	Localized long-term	-	Yes	Yes
	Vegetative Manipulation	75. Disturbance by Vegetative Manipulation	Localized long-term	-	No	No
Paleontology	Project Construction	76. Disturbance-Morrison Formation	Localized long-term	-	Yes	Yes
Visual Resources	Grazing Systems	77. Increased Wildfires	Area-wide long-term	-	No	Yes
		78. Contrast	Area-wide short-term	-	No	Yes
	Project Construction	79. Contrast-Fences	Area-wide long-term	-	Yes	Yes
		80. Contrast-Spring Development	Localized long-term	-	Yes	Yes
		81. Contrast-Water Catchments	Localized long-term	-	Yes	Yes
		82. Contrast-Storage Tanks, Troughs, Well Sites	Localized long-term	-	Yes	Yes
	Vegetative Manipulation	83. Contrast	Localized long-term	-	No	Yes
Recreation	Grazing Systems	84. Less Wildlife/Livestock Competition	Area-wide long-term	+	No	No
		85. Increased Wildfires	Area-wide long-term	-	No	Yes
	Project Construction	86. Water Development	Area-wide long-term	+-	No	Yes
		87. Fences	Localized long-term	-	Yes	Yes
	Vegetative Manipulation	88. Smoke, Contrast	Localized long-term	-	No	Yes
	Ignacio Chavez Grant	89. Land Alterations	Localized long-term	+-	No	Yes

(Continued)

Table III-1 (continued)

Page 5 of 5 Pages

Resource	Source of Impact	Impact	Magnitude of Impact		Mitigating Measures (Chapter IV)	Unavoidable Adverse Impact (Chapter V)
Recreation (continued)	Mesa de Cuba	90. Land Alterations	Localized long-term	+-	No	Yes
	La Ventana	91. Land Alterations	Localized short-term	+-	No	Yes
	Cabezon Peak	92. Land Alterations	Localized long-term	+-	No	No
Livestock Grazing	Grazing Systems	93. Initial Adjustment in Livestock AUMs	Localized short-term	-	No	Yes
		94. Combination of Allotments	Localized long-term	-	Yes	Yes
		95. Individual Allotments not Combined	Localized long-term	-	No	Yes
		96. Livestock Concentration in Use Pasture	Area-wide long-term	+-	No	Yes
		97. Livestock Losses from Poisonous Plants	Area-wide short-term	-	No	No
		98. Change in Season of Use	Localized long-term	-	No	Yes
		99. Improved Forage Production	Area-wide long-term	+	No	No
		100. Attitude Conflicts Due to Increased Management	Area-wide short-term	-	Yes	Yes
		101. Elimination of Livestock AUMs	Localized long-term	-	No	Yes
Forestry	Grazing Systems	102. Vegetative Competition	Localized long-term	-	No	No
		103. Livestock Rubbing	Localized long-term	-	No	No
		104. Livestock Trampling	Localized long-term	-	No	No
		105. Increased Wildfires	Area-wide long-term	-	No	Yes
Transportation Networks	Grazing Systems	106. Unauthorized Locked Gates	Localized short-term	-	No	No
		107. Improved Access	Localized long-term	-	No	No
Socio-Economics	Grazing Systems	108. Implementation of AMPs	Area-wide long-term	+	No	No
		109. Initial Reduction of Livestock AUMs	Localized long-term	-	No	Yes
		110. Increase of Livestock AUMs by Year 2000	Area-wide long-term	+	No	No
		111. Increased Employment	Area-wide long-term	+	No	No
		112. Improved Recreation Resource	Area-wide long-term	+	No	No
		113. Elimination of Livestock AUMs	Localized long-term	-	No	Yes
		114. Socio-cultural Factors	Area-wide long-term	+-	No	Yes

Key: + = Positive Impact
- = Negative Impact

Source: Summarization of Chapter III

Table III-2

SUMMARY OF ANTICIPATED IMPACTS BY ALLOTMENT*

Proposed Action

Allotment Name	Allot. No.	Impact Number								
		3	4	5	8	10	11	12	13	16
Corrales Tierra	55	X				X	X			X
Senorito	19	X				X	X			X
Mesa Portales	17	X				X	X			
Nacimiento	14	X				X	X			
Ridge Top	24	X				X	X			X
Salado-Tapia	51	X				X	X			
Arroyo Alamito	45	X			X	X	X			X
Arroyo Piedra Parada	54	X				X	X			X
Cachulie	39	X			X	X	X			X
Cebo Community	33	X	X	X	X	X	X	X	X	X
Coal Creek	29	X	X	X		X	X	X	X	X
El Banquito	49	X				X	X			X
Fork Rock Mesa	16	X				X	X			X
Forty-four	18	X			X	X	X			X
Gypsum Hill	61	X				X	X			X
Lagunitas	12	X			X	X	X			X
Ojo de los Pinos	8	X				X	X			X
Pelon	3	X				X	X			X
San Pablo	20	X				X	X			X
Shroyer	2	X			X	X	X			X
Arroyo Empedrado	36	X				X	X			X
Azabache	42	X				X	X			X
Banco de la Casa	52	X				X	X			
Cabezon Peak	44	X				X	X			X
Canon del Camino	53	X				X	X			X
Cerro Cuate	41	X				X	X			X
Cucho Arroyo	57	X			X	X	X			X
Dry Well	27	X				X	X			X
Horn Arroyo	9	X				X	X			X
Lost Valley	40	X			X	X	X			X
Mesa Cortada	48	X			X	X	X			
North San Luis Mesa	37	X				X	X			X
Pipeline	56	X			X	X	X			X
Rio Salado Community	59	X			X	X	X			X
Rock House	60	X			X	X	X			X
San Luis Community	38	X			X	X	X			X
San Ysidro Pasture	46	X				X	X			X
Valle San Isidro	15	X				X	X			X
Chico Crossing	43	X				X	X			X
Continental Divide	1	X			X	X	X			X
Dry Springs	5	X				X	X			X
Eagle Mesa	23	X			X	X	X			X
Guadalupe Community	47	X				X	X			X
Penistaja	11	X			X	X	X			X
Piedra Lumbre	28	X				X	X			X
Torreon Wash	35	X				X	X			X
Twin Butte	34	X				X	X			X
Brandy	10	X				X	X			X
Starr	4	X				X	X			X
Ignacio Chavez Grant	50	X			X	X	X			X
Chiuilla Community	7	X	X	X		X	X	X	X	X
Elk Springs	30	X	X	X	X	X	X	X	X	X
Mighty Mite	58	X			X	X	X			X
Tres Hermanos	6	X			X	X	X			X
Canada Candelaria	31	X				X	X			X
Los Pinos Arroyo	26	X				X	X			X
Cerro Colorados	32	X				X	X			X
Bama	21	X				X	X			
Molino	13									X
Rock Ridge	25									
San Miguel	22									X

Allotment Name	Allot. No.	Impact Number 19	20	26	31	32	34	35	36	37
Corrales Tierra	55	X			X					
Senorito	19	X		X	X		X			
Mesa Portales	17	X		X	X		X			
Nacimiento	14	X		X	X		X			
Ridge Top	24	X			X					
Salado-Tapia	51	X			X					
Arroyo Alamito	45	X		X	X		X			X
Arroyo Piedra Parada	54	X		X	X		X			X
Cachulie	39	X		X	X		X			X
Cebo Community	33	X	X	X	X	X	X			
Coal Creek	29	X	X	X	X	X	X			
El Banquito	49	X		X	X		X			
Fork Rock Mesa	16	X		X	X		X			
Forty-four	18	X		X	X		X			
Gypsum Hill	61	X		X	X		X			
Lagunitas	12	X		X	X		X			
Ojo de los Pinos	8	X		X	X		X			
Pelon	3	X		X	X		X			
San Pablo	20	X		X	X		X			X
Shroyer	2	X		X	X		X			
Arroyo Empedrado	36	X		X	X		X			
Azabache	42	X		X	X		X	X	X	
Banco de la Casa	52	X			X					
Cabezon Peak	44	X		X	X		X	X		
Canon del Camino	53	X		X	X		X			
Cerro Cuate	41	X		X	X		X			
Cucho Arroyo	57	X		X	X		X			
Dry Well	27	X		X	X		X			X
Horn Arroyo	9	X		X	X		X			
Lost Valley	40	X		X	X		X			X
Mesa Cortada	48	X			X					
North San Luis Mesa	37	X		X	X		X			
Pipeline	56	X		X	X		X			
Rio Salado Community	59	X		X	X		X			
Rock House	60	X		X	X		X			
San Luis Community	38	X		X	X		X			
San Ysidro Pasture	46	X		X	X		X			X
Valle San Isidro	15	X		X	X		X			
Chico Crossing	43	X		X	X		X			
Continental Divide	1	X		X	X		X			
Dry Springs	5	X		X	X		X			
Eagle Mesa	23	X		X	X		X			
Guadalupe Community	47	X		X	X		X			
Penistaja	11	X		X	X		X			
Piedra Lumbre	28	X		X	X		X			
Torreon Wash	35	X		X	X		X			
Twin Butte	34	X		X	X	X	X			
Brandy	10	X		X	X		X			
Starr	4	X		X	X		X			
Ignacio Chavez Grant	50	X		X	X		X			X
Chiuilla Community	7	X	X	X	X	X	X	X	X	
Elk Springs	30	X	X	X	X	X	X			X
Mighty Mite	58	X			X					
Tres Hermanos	6	X		X	X		X			
Canada Candelaria	31	X		X	X	X	X			
Los Pinos Arroyo	26	X		X	X		X			X
Cerro Colorados	32	X		X	X		X			
Bama	21	X			X					
Molino	13									
Rock Ridge	25			X			X			
San Miguel	22									

Allotment Name	Allot. No.	40	41	42	43	44	45	46	50	51	52
Corrales Tierra	55	X	X		X	X			X	X	X
Senorito	19	X	X		X	X			X	X	X
Mesa Portales	17	X			X	X					X
Nacimiento	14	X		X	X	X			X		X
Ridge Top	24	X	X	X	X	X			X	X	X
Salado-Tapia	51	X	X		X	X			X	X	X
Arroyo Alamito	45	X	X	X	X	X			X	X	X
Arroyo Piedra Parada	54	X	X	X	X	X			X	X	X
Cachulie	39	X	X		X	X			X	X	X
Cebo Community	33	X	X	X	X	X	X		X	X	X
Coal Creek	29	X	X		X	X	X		X	X	X
El Banquito	49	X	X		X	X			X	X	X
Fork Rock Mesa	16		X	X						X	
Forty-four	18		X	X						X	
Gypsum Hill	61	X	X	X	X	X			X	X	X
Lagunitas	12		X	X						X	
Ojo de los Pinos	8		X							X	
Pelon	3		X							X	
San Pablo	20	X	X		X	X			X	X	X
Shroyer	2	X	X		X	X			X	X	X
Arroyo Empedrado	36	X	X	X	X	X			X	X	X
Azabache	42	X	X	X	X	X			X	X	X
Banco de la Casa	52	X			X	X			X		X
Cabezon Peak	44	X	X	X	X	X			X	X	X
Canon del Camino	53	X	X	X	X	X			X	X	X
Cerro Cuate	41	X	X		X	X			X	X	X
Cucho Arroyo	57	X	X	X	X	X			X	X	X
Dry Well	27	X	X	X	X	X			X	X	X
Horn Arroyo	9		X	X						X	
Lost Valley	40	X	X		X	X			X	X	X
Mesa Cortada	48	X		X	X	X			X		X
North San Luis Mesa	37	X	X		X	X			X	X	X
Pipeline	56	X	X		X	X			X	X	X
Rio Salado Community	59	X	X		X	X			X	X	X
Rock House	60	X	X	X	X	X			X	X	X
San Luis Community	38	X	X		X	X			X	X	X
San Ysidro Pasture	46	X	X	X	X	X			X	X	X
Valle San Isidro	15	X	X		X	X			X	X	X
Chico Crossing	43	X	X		X	X			X	X	X
Continental Divide	1		X							X	
Dry Springs	5		X							X	
Eagle Mesa	23	X	X	X	X	X			X	X	X
Guadalupe Community	47	X	X	X	X	X			X	X	X
Penistaja	11	X	X		X	X			X	X	X
Piedra Lumbre	28		X							X	
Torreon Wash	35	X	X	X	X	X			X	X	X
Twin Butte	34	X	X	X	X	X	X		X	X	X
Brandy	10	X	X	X	X	X			X	X	X
Starr	4		X							X	
Ignacio Chavez Grant	50	X	X	X	X	X			X	X	X
Chiuilla Community	7	X	X		X	X	X		X	X	X
Elk Springs	30		X		X	X	X		X	X	X
Mighty Mite	58	X	X		X	X			X	X	X
Tres Hermanos	6		X							X	
Canada Candelaria	31	X	X	X	X	X	X		X	X	X
Los Pinos Arroyo	26		X	X						X	
Cerro Colorados	32		X							X	
Bama	21			X				X			
Molino	13		X					X		X	
Rock Ridge	25							X			
San Miguel	22		X					X		X	

Allotment Name	Allot. No.	Impact Number									
		53	54	55	57	59	63	65	66	67	68
Corrales Tierra	55	X	X				X	X	X	X	
Senorito	19	X	X				X	X	X	X	
Mesa Portales	17	X	X				X	X	X	X	
Nacimiento	14	X	X			X	X	X	X	X	
Ridge Top	24	X	X			X	X	X	X	X	
Salado-Tapia	51	X	X				X	X	X	X	
Arroyo Alamito	45	X	X			X	X	X	X	X	
Arroyo Piedra Parada	54	X	X			X	X	X	X	X	
Cachulie	39	X	X				X	X	X	X	
Cebo Community	33	X	X			X	X	X	X	X	X
Coal Creek	29	X	X				X	X	X	X	X
El Banquito	49	X	X			X	X	X	X	X	X
Fork Rock Mesa	16					X		X			
Forty-four	18					X		X			
Gypsum Hill	61	X	X			X	X	X	X	X	
Lagunitas	12					X		X			
Ojo de los Pinos	8										
Pelon	3										
San Pablo	20	X	X				X	X	X	X	
Shroyer	2	X	X				X	X	X	X	
Arroyo Empedrado	36	X	X			X	X	X	X	X	
Azabache	42	X	X			X	X	X	X	X	
Banco de la Casa	52	X	X			X	X	X	X	X	
Cabezon Peak	44	X	X			X	X	X	X	X	
Canon del Camino	53	X	X			X	X	X	X	X	
Cerro Cuate	41	X	X				X	X	X	X	
Cucho Arroyo	57	X	X			X	X	X	X	X	
Dry Well	27	X	X			X	X	X	X	X	
Horn Arroyo	9					X		X			
Lost Valley	40	X	X				X	X	X	X	
Mesa Cortada	48	X	X			X	X	X	X	X	
North San Luis Mesa	37	X	X				X	X	X	X	
Pipeline	56	X	X				X	X	X	X	
Rio Salado Community	59	X	X			X	X	X	X	X	
Rock House	60	X	X			X	X	X	X	X	
San Luis Community	38	X	X				X	X	X	X	
San Ysidro Pasture	46	X	X			X	X	X	X	X	
Valle San Isidro	15	X	X				X	X	X	X	
Chico Crossing	43	X	X				X	X	X	X	
Continental Divide	1										
Dry Springs	5										
Eagle Mesa	23	X	X			X	X	X	X	X	
Guadalupe Community	47	X	X			X	X	X	X	X	
Penistaja	11	X	X				X	X	X	X	
Piedra Lumbre	28										
Torreon Wash	35	X	X			X	X	X	X	X	
Twin Butte	34	X	X	X		X	X	X	X	X	X
Brandy	10	X	X			X	X	X	X	X	
Starr	4										
Ignacio Chavez Grant	50	X	X		X	X	X	X	X	X	
Chiuilla Community	7	X	X				X	X	X	X	X
Elk Springs	30	X	X				X	X	X	X	X
Mighty Mite	58	X	X				X	X	X	X	
Tres Hermanos	6										
Canada Candelaria	31	X	X			X	X		X	X	X
Los Pinos Arroyo	26					X		X			
Cerro Colorados	32										
Bama	21					X		X			
Molino	13										
Rock Ridge	25										
San Miguel	22										

Table III-2 (continued)

	Allot.	Impact Number									
Allotment Name	No.	69	70	72	74	75	76	79	80	81	82
Corrales Tierra	55	X									X
Senorito	19	X									X
Mesa Portales	17	X									X
Nacimiento	14	X						X			X
Ridge Top	24	X						X			X
Salado-Tapia	51	X									X
Arroyo Alamito	45	X						X			X
Arroyo Piedra Parada	54	X					X	X			X
Cachulie	39	X									X
Cebo Community	33	X	X			X		X			X
Coal Creek	29	X	X			X				X	X
El Banquito	49	X	X								X
Fork Rock Mesa	16	X						X			
Forty-four	18	X						X			
Gypsum Hill	61	X					X	X			X
Lagunitas	12	X						X			
Ojo de los Pinos	8	X									
Pelon	3	X									
San Pablo	20	X								X	X
Shroyer	2	X									X
Arroyo Empedrado	36	X						X			X
Azabache	42	X		X				X			X
Banco de la Casa	52	X		X	X						X
Cabezon Peak	44	X						X			X
Canon del Camino	53	X						X			X
Cerro Cuate	41	X									X
Cucho Arroyo	57	X					X	X	X		X
Dry Well	27	X						X			X
Horn Arroyo	9	X						X			
Lost Valley	40	X									X
Mesa Cortada	48	X						X			X
North San Luis Mesa	37	X									X
Pipeline	56	X					X				X
Rio Salado Community	59	X					X		X		X
Rock House	60	X					X	X			X
San Luis Community	38	X									X
San Ysidro Pasture	46	X						X			X
Valle San Isidro	15	X									X
Chico Crossing	43	X							X		X
Continental Divide	1	X									
Dry Springs	5	X									
Eagle Mesa	23	X						X	X		X
Guadalupe Community	47	X			X			X			
Penistaja	11	X									X
Piedra Lumbre	28	X		X							
Torreon Wash	35	X						X			X
Twin Butte	34	X				X		X			X
Brandy	10	X						X			X
Starr	4	X									
Ignacio Chavez Grant	50	X						X		X	X
Chiuilla Community	7	X	X			X					X
Elk Springs	30	X	X			X				X	X
Mighty Mite	58	X					X				X
Tres Hermanos	6	X									
Canada Candelaria	31	X				X		X			X
Los Pinos Arroyo	26	X						X			
Cerro Colorados	32	X									
Bama	21							X			
Molino	13	X									
Rock Ridge	25	X									
San Miguel	22	X									

Allotment Name	Allot. No.	Impact Number 83	86	87	88	89	90	91	92	94	95
Corrales Tierra	55		X								X
Senorito	19		X								X
Mesa Portales	17		X								X
Nacimiento	14		X	X						X	
Ridge Top	24		X	X							X
Salado-Tapia	51		X							X	
Arroyo Alamito	45		X	X							X
Arroyo Piedra Parada	54		X	X						X	
Cachulie	39		X								X
Cebo Community	33	X	X	X	X						X
Coal Creek	29	X	X		X			X			X
El Banquito	49		X			X					X
Fork Rock Mesa	16			X							X
Forty-four	18			X							X
Gypsum Hill	61		X	X							X
Lagunitas	12			X			X				X
Ojo de los Pinos	8										X
Pelon	3										X
San Pablo	20		X							X	
Shroyer	2		X								X
Arroyo Empedrado	36		X	X						X	
Azabache	42		X	X						X	
Banco de la Casa	52		X							X	
Cabezon Peak	44		X	X					X	X	
Canon del Camino	53		X	X							X
Cerro Cuate	41		X								X
Cucho Arroyo	57		X	X							X
Dry Well	27		X	X						X	
Horn Arroyo	9			X							X
Lost Valley	40		X							X	
Mesa Cortada	48		X	X		X					X
North San Luis Mesa	37		X							X	
Pipeline	56		X							X	
Rio Salado Community	59		X							X	
Rock House	60		X	X							X
San Luis Community	38		X								X
San Ysidro Pasture	46		X	X							X
Valle San Isidro	15		X							X	
Chico Crossing	43		X								X
Continental Divide	1									X	
Dry Springs	5										X
Eagle Mesa	23		X	X							X
Guadalupe Community	47		X	X						X	
Penistaja	11		X				X			X	
Piedra Lumbre	28									X	
Torreon Wash	35		X	X							X
Twin Butte	34	X	X	X						X	
Brandy	10		X	X						X	
Starr	4										X
Ignacio Chavez Grant	50		X	X		X				X	
Chiuilla Community	7	X	X		X		X				X
Elk Springs	30	X	X		X			X			X
Mighty Mite	58		X								X
Tres Hermanos	6										X
Canada Candelaria	31	X	X	X						X	
Los Pinos Arroyo	26			X							X
Cerro Colorados	32										X
Bama	21			X							X
Molino	13										X
Rock Ridge	25										X
San Miguel	22										X

Table III-2 (continued)

Page 7 of 7 Pages

Allotment Name	Allot. No.	96	98	101	102	103	104	107	109	113
		Impact Number								
Corrales Tierra	55		X					X	X	
Senorito	19		X						X	
Mesa Portales	17								X	
Nacimiento	14								X	
Ridge Top	24							X	X	
Salado-Tapia	51		X						X	
Arroyo Alamito	45	X						X		
Arroyo Piedra Parada	54							X	X	
Cachulie	39	X								
Cebo Community	33	X						X		
Coal Creek	29								X	
El Banquito	49				X	X	X		X	
Fork Rock Mesa	16							X	X	
Forty-four	18	X								
Gypsum Hill	61		X					X	X	
Lagunitas	12	X						X		
Ojo de los Pinos	8				X	X	X		X	
Pelon	3								X	
San Pablo	20								X	
Shroyer	2	X								
Arroyo Empedrado	36							X	X	
Azabache	42							X	X	
Banco de la Casa	52								X	
Cabezon Peak	44							X	X	
Canon del Camino	53							X	X	
Cerro Cuate	41								X	
Cucho Arroyo	57	X						X		
Dry Well	27							X	X	
Horn Arroyo	9							X	X	
Lost Valley	40	X								
Mesa Cortada	48	X						X		
North San Luis Mesa	37								X	
Pipeline	56	X								
Rio Salado Community	59	X								
Rock House	60	X						X		
San Luis Community	38	X								
San Ysidro Pasture	46							X	X	
Valle San Isidro	15								X	
Chico Crossing	43								X	
Continental Divide	1	X							X	
Dry Springs	5				X	X	X		X	
Eagle Mesa	23	X						X	X	
Guadalupe Community	47							X	X	
Penistaja	11	X							X	
Piedra Lumbre	28								X	
Torreon Wash	35							X	X	
Twin Butte	34							X	X	
Brandy	10							X	X	
Starr	4				X	X	X		X	
Ignacio Chavez Grant	50	X			X	X	X	X		
Chiuilla Community	7				X	X	X			
Elk Springs	30	X							X	
Mighty Mite	58	X								
Tres Hermanos	6	X								
Canada Candelaria	31							X	X	
Los Pinos Arroyo	26							X	X	
Cerro Colorados	32								X	
Bama	21							X		
Molino	13			X						X
Rock Ridge	25			X						X
San Miguel	22			X						X

*Impacts which occur on all allotments: 2, 6, 7, 9, 14, 15, 17, 18, 21, 22, 23, 24, 27, 29, 33, 38, 39, 47, 48, 49, 56, 60, 61, 62, 71, 73, 77, 78, 84, 85, 105, 112.

Impacts which occur on all allotments except Bama, Molino, Rock Ridge and San Miguel: 1, 25, 28, 30, 58, 64, 93, 97, 99, 100, 106, 108, 110, 111.

Source: Summary of Chapter III

TABLE III-3

ACREAGE DATA FOR SOURCES OF ANTICIPATED IMPACTS

Proposed Action

1. Rest and Deferred Rotation Grazing Systems a/

	Public Lands
Rest Rotation	370,182
Deferred Rotation	22,381
Total	392,563

2. Construction and Physical Presence of Range Improvement Projects b/

			AVERAGE ACRES DISTURBED THROUGH IMPLEMENTATION OF PROPOSED ACTION			
			PER UNIT		TOTAL	
RANGE IMPROVEMENT	Unit	TOTAL UNITS	SHORT TERM	LONG TERM	SHORT TERM	LONG TERM
WATER DEVELOPMENT						
Wells	No.	11	0.50	0.10	5.50	1.10
Springs	No.	7	0.10	0.05	0.70	0.35
Catchments	No.	4	1.00	0.50	4.00	2.00
Pit Tanks	No.	1	3.80	1.80	3.80	1.80
Storage Tank	No./Gal.	12/254,000	0.08	0.04	0.96	0.48
Water Trough	No.	139	0.10	0.08	13.90	11.12
Wildlife Water	No.	73	0.10	0.01	7.30	0.73
Pipeline	Mi.	166.7	1.50	0.10	250.05	16.67
Easement	No./Mi.	31/33.1				
FENCE						
Proposed	Mi.	65.9	1.00	0.20	65.90	13.18
Cattleguard	No.	55	0.06	0.06	3.30	3.30
STOCK TRAIL						
Proposed	Mi.	0.5	2.70	1.50	1.35	0.75
ROAD						
Piedra Lumbre						
Reconstruction	Mi.	22.4	4.50	1.50	100.8	33.60
Easements	No./Mi.	8/4.0	-	-	-	-
Maintenance c/	Mi.	381.9	1.60	-	611.04	-
Easements	No./Mi.	136/85.2	-	-	-	-
TOTAL (Rounded to nearest whole number)					1,069	85

3. Vegetative Manipulation

		Acres
Sagebrush burning and seeding		
Cebo Community Allotment		1,465
Chiuilla Allotment		260
Coal Creek Allotment		160
Elk Springs Allotment		160
	Sub-total	2,045
Rotary Brushcutting (Sagebrush)		
Canada Candelaria Allotment		400
Twin Butte Allotment		80
	Sub-total	480
	Total	2,525

4. Ungrazed Allotments

	Public Lands
Bama	96
Molino	80
Rock Ridge	264
San Miguel	80
Total	520

---

a/ See Table I-2 for break down by allotment

b/ See Table I-7 for break down by allotment. Range improvement projects would be maintained as required in BLM Manuals.

c/ Road maintenance at the year 2000 would not be greater than what currently exists.

Source: Summarized from the Proposed Action, Chapter I susceptible to wind erosion. In these exposed areas there would be an adverse impact on air quality when high winds cause soil erosion. It is difficult to quantify ambient dust resulting from these projects. The impact is extremely localized within a much larger area (511,916 acres) and the cumulative impact is negligible.

Source of Impacts: Vegetative Manipulation

4. SMOKE

Vegetative manipulation through sagebrush burning on four allotments (2,045 acres) would result in a localized, short-term decrease in air quality. These one-time occurrences (two days during the spring) would have minor impacts on air quality.

5. INCREASED WIND EROSION

The acres undergoing sagebrush burning would also be subject to short-term, localized wind erosion prior to revegetation. Wind erosion is difficult to quantify, but is considered a minor impact on air quality.

Soils

Source of Impact: Rest and Deferred Rotation Grazing Systems

6. LESS WIND EROSION

Increased total ground cover resulting from implementation of grazing systems would decrease exposed ground surface and reduce wind erosion. This increase is illustrated on table II–44 (Future Areas with AMP s) which shows substantial increases in ground cover on areas with existing AMP s particularly for the Shortgrass, Ponderosa Pine (South) and Four wing Saltbush. See Table II-44, Future Areas with AMPs, for predicted changes in ground cover. The decrease in soil erosion by wind would be a beneficial, long-term area-wide impact.

7. LESS WATER EROSION

Christianburg-Navajo, Litle-Las Lucas, Billings-Persayo, and Travesilla-Persayo soil associations (75 percent of the area) presently yield the greatest volume of sediment through water erosion. These associations are more susceptible to erosion because their major soils are derived from parent materials having a high clay content. Critical soil loss can range from one to five tons per acre dependent upon the depth of soils examined. (Guide for Interpreting Engineering Uses for Soils, USDA SCS November 1971.) Table III-4 shows the predicted weighted average sediment yield which would result from increased total ground cover. Erosion condition classes would also change to reflect beneficial increases in vegetative cover and litter on these soil associations. See Map II-2 and Map III-1 for comparison of present and anticipated erosion condition classes. Table III-5 depicts erosion condition class changes for each allotment. Less water erosion is also supported by Table III-5 which depicts increased acreage in the stable and slight erosion condition classes resulting from the proposed action. Similarly, Table III-5 indicates approximately a 30 percent decreased acreage in the critical and severe erosion condition classes.

The decrease in soil erosion would be a long-term, area-wide, beneficial impact.

8. INCREASED WATER EROSION

The concentration of livestock at watering sites (tanks, ponds, etc.) in use pastures would cause short-term increases in water erosion at these locations. As forage abundance, vegetative cover, and litter increase, the impact would become negligible. This impact affects approximately 35 acres and occurs on any soil where a watering site is located. See Table III-3 for acreage involved in proposed water developments; Visual C shows locations of existing and proposed range improvements.

9. INCREASED WATER RETENTION

Anticipated ground cover increases would result in greater water retention in soils. Increased ground cover would decrease runoff rates. Water would then enter and be retained in the soil, depending on permeability rates and available water holding capacities for the various soils (Table II-4 shows this information by soil series). The overall impact on soils would be decreased wind and water erosion which is a beneficial, area-wide, long-term impact.

Source of Impact: Construction and Physical Presence of Range Improvement Projects

10. SOIL DISTURBANCE

Construction of range improvement projects would involve short-term mechanical disturbance of 1,069 acres of soil; after revegetation. 85 of these acres would continue to be disturbed. This would be a long-term, localized impact. The

Table III-4

ESTIMATED WEIGHTED AVERAGE SEDIMENT YIELD BY SOIL ASSOCIATION

RIO PUERCO ES AREA

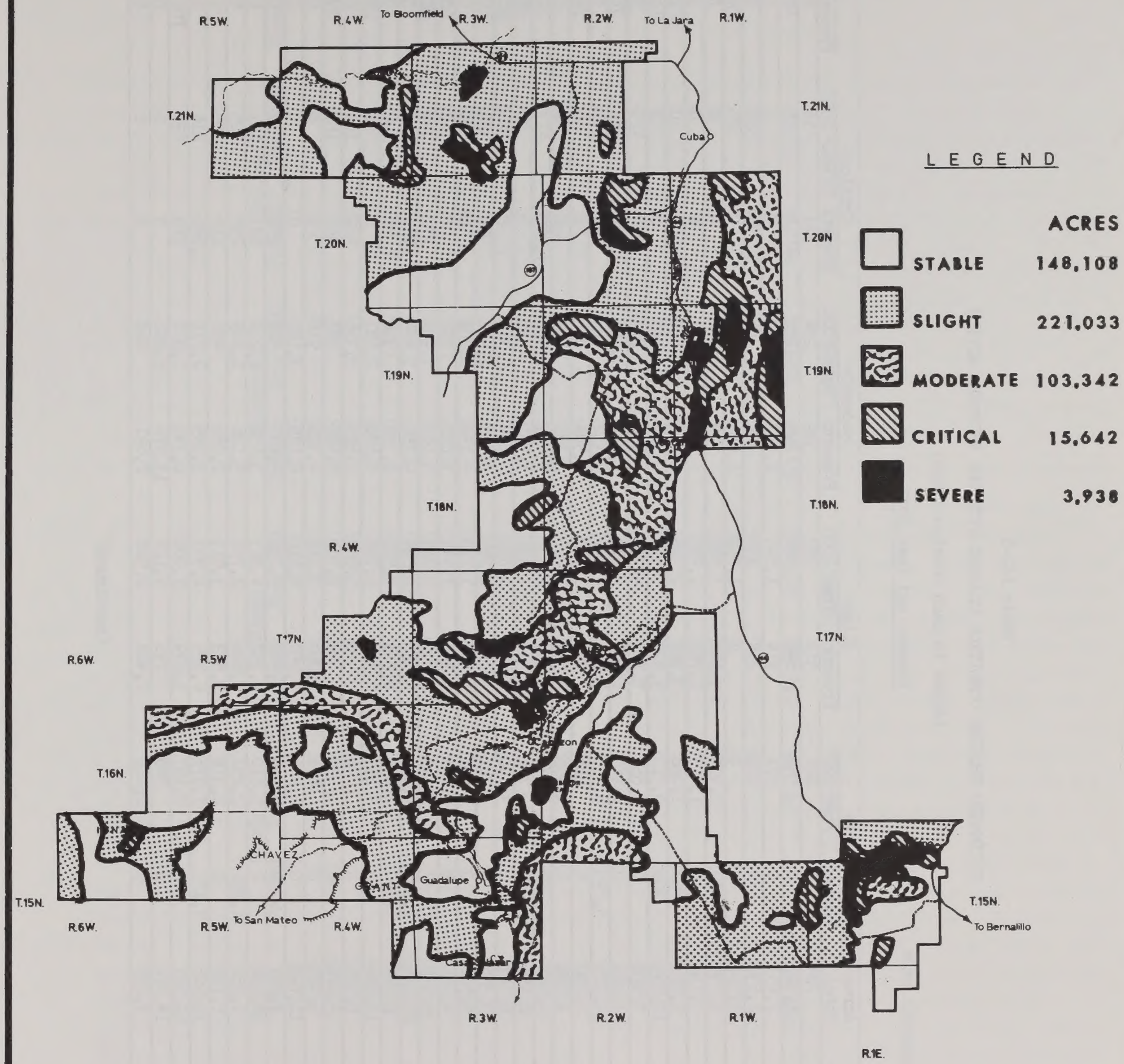
Soil Association and % Slope	Area Sq. Mi.[1]	Present Yield Tons/Sq. Mi./Year	Yield Year 2000 With Proposed Action (Tons/Sq. Mi./Year)	Reduced Soil Loss Due To Proposed Action (Tons/Sq. Mi./Year)
Christianburg-Navajo (0-3%)	50.4	1,530	990	540
Litle-Las Lucas (0-15%)	146.9	1,170	900	270
Penistaja-Berent-Sandstone (0-60%)	138.6	810	630	180
Basalt Outcrop-Cabezon-Torreon (9-75%)	49.2	630	450	180
Billings-Persayo (1-25%)	145.9	1,620	1,170	450
Travessilla-Persayo (3-25%)	268.9	1,170	900	270

[1] Includes all public lands and other lands within ES Area boundaries.

Source: Soil Conservation Service; Cabezon Soil Survey 1971

ESTIMATED EROSION CONDITIONS FOR PROPOSED ACTION

RIO PUERCO E.S. AREA



SOURCE: PROJECTED FROM 1975 BLM RESOURCE INVENTORY

MAP III-1

Table III-5

ESTIMATED EROSION CONDITION CLASSES WITH THE PROPOSED ACTION

(Acres In Each Erosion Class)

Present and Year 2000

Allotment Name and No.	Acres Total	Stable Present	Stable Year 2000	Slight Present	Slight Year 2000	Moderate Present	Moderate Year 2000	Critical Present	Critical Year 2000	Severe Present	Severe Year 2000
Corrales Tierra (55)	784	0	282	314	282	329	204	141	16	0	0
Senorito (19)	1,797	0	539	898	988	899	270	0	0	0	0
Mesa Portales (17)	2,857	0	571	914	1,543	1,943	743	0	0	0	0
Nacimiento (14)	2,530	0	228	354	430	405	1,366	1,771	506	0	0
Ridgetop (24)	1,790	0	0	0	1,056	1,683	627	0	35	107	72
Salado Tapia (51)	4,795	432	2,925	3,644	1,582	719	288	0	0	0	0
Arroyo Alamito (45)	3,710	0	1,855	2,782	1,484	928	371	0	0	0	0
Arroyo Piedra Parada (54)	5,073	457	1,268	3,348	2,993	1,268	812	0	0	0	0
Cachulie (39)	10,233	306	9,312	9,825	819	102	102	0	0	0	0
Cebo Community (33)	7,920	0	2,851	7,128	4,357	158	237	634	475	0	0
Coal Creek (29)	7,627	0	1,144	1,602	4,271	4,347	1,754	1,602	382	76	76
El Banquito (49)	14,725	5,890	8,835	3,976	4,859	4,712	884	147	147	0	0
Fork Rock Mesa (16)	2,400	0	528	792	1,200	1,584	648	0	0	24	24
Forty-four (18)	4,685	0	1,405	2,530	2,296	2,155	984	0	0	0	0
Gypsum Hill (61)	4,634	0	742	1,159	1,437	2,039	1,992	1,390	417	46	46
Lagunitas (12)	2,965	0	771	1,394	1,334	1,571	860	0	0	0	0
Ojo de los Pinos (8)	6,317	0	3,790	5,054	1,832	884	316	0	126	379	253
Pelon (3)	9,355	0	281	281	6,218	8,138	2,482	936	374	0	0
San Pablo (20)	4,506	0	991	1,352	1,713	3,154	1,802	0	0	0	0
Shroyer (2)	4,848	0	2,715	3,248	1,939	1,600	194	0	0	0	0
Arroyo Empedrado (36)	4,535	0	363	590	2,041	3,673	1,904	272	227	0	0
Azabache (42)	21,198	1,908	9,015	9,327	10,699	9,751	1,484	212	0	0	0
Banco de la Casa (52)	6,627	1,590	2,054	2,718	3,579	2,319	994	0	0	0	0
Cabezon Peak (44)	12,063	0	3,257	6,393	6,705	5,670	2,101	0	0	0	0
Canon del Camino (53)	5,025	0	0	0	1,608	4,623	3,316	402	101	0	0
Cerro Cuate (41)	3,926	0	39	39	2,709	3,495	982	353	157	39	39
Cucho Arroyo (57)	5,401	0	864	1,080	3,619	4,321	918	0	0	0	0
Dry Well (27)	11,729	0	2,346	3,050	6,216	8,679	3,167	0	0	0	0
Horn Arroyo (9)	4,757	0	999	1,380	3,235	3,187	428	190	95	0	0
Lost Valley (40)	12,104	0	5,810	8,352	4,963	3,631	1,210	121	121	0	0
Mesa Cortada (48)	6,252	1,250	2,251	1,626	2,751	3,126	1,125	250	125	0	0
North San Luis Mesa (37)	5,795	0	2,318	3,593	3,013	2,086	406	116	58	0	0
Pipeline (56)	13,605	2,177	7,075	6,395	2,943	3,945	2,771	1,088	816	0	0
Rio Salado Community (59)	10,937	0	2,187	3,609	5,906	6,343	1,970	219	437	766	437
Rock House (60)	14,712	0	588	736	9,122	13,976	5,002	0	0	0	0
San Luis Community (38)	5,059	0	1,619	2,428	2,580	2,631	860	0	0	0	0

(continued)

Table III-5 (continued)

Allotment Name and No.	Acres Total	Stable		Slight		Moderate		Critical		Severe	
		Present	Year 2000	Present	Year 2000	Present	Year 2000	Present	Year 2000	Present	Year 2000
San Ysidro Pasture (46)	5,490	0	0	111	4,117	5,379	1,373	0	0	0	0
Valle San Isidro (15)	5,596	0	3,637	4,812	1,567	616	336	168	56	0	0
Chico Crossing (43)	15,339	460	3,528	3,681	8,590	10,738	3,068	460	153	0	0
Continental Divide (1)	12,019	0	1,683	2,404	8,053	9,495	2,163	0	0	120	120
Dry Springs (5)	6,976	0	1,325	1,605	3,767	5,092	1,605	70	209	209	70
Eagle Mesa (23)	15,745	0	3,306	6,456	7,873	7,400	3,779	1,889	787	0	0
Guadalupe Community (47)	9,813	785	4,710	6,574	3,140	1,276	1,668	1,178	295	0	0
Penistaja (11)	24,608	11,320	16,241	11,320	6,890	984	492	0	246	984	739
Piedra Lumbre (28)	7,917	237	2,692	3,563	2,375	2,217	1,821	1,742	950	158	79
Torreon Wash (35)	8,075	0	485	1,211	3,149	3,392	3,956	3,472	485	0	0
Twin Butte (34)	12,610	0	3,784	4,287	4,287	5,927	2,900	2,270	1,513	126	126
Brandy (10)	28,571	0	3,714	6,571	14,229	16,578	8,913	4,851	1,429	571	286
Starr (4)	16,124	0	2,419	5,482	6,127	7,901	6,450	2,419	967	322	161
Ignacio Chavez Grant (50)	24,668	7,954	7,954	10,607	10,671	6,167	6,043	0	0	0	0
Chiuilla Community (7)	9,881	0	4,051	6,028	3,952	3,063	1,383	790	495	0	0
Elk Springs (30)	3,141	0	502	879	817	1,068	1,288	1,194	534	0	0
Mighty Mite (58)	1,111	0	0	0	622	978	422	133	67	0	0
Tres Hermanos (6)	4,016	0	2,410	3,974	1,606	42	0	0	0	0	0
Canada Candelaria (31)	8,617	0	431	1,034	5,946	7,583	2,240	0	0	0	0
Los Pinos Arroyo (26)	5,040	0	0	0	1,713	4,183	2,470	0	101	857	756
Cerro Colorados (32)	17,989	0	3,418	4,677	7,196	9,534	5,217	3,598	1,978	180	180
Bama (21)	96	0	0	0	0	0	77	96	19	0	0
Molino (13)	80	0	0	0	0	0	48	80	32	0	0
Rock Ridge (25)	1,185	0	0	0	0	0	0	0	711	1,185	474
San Miguel (22)	80	0	0	0	24	80	56	0	0	0	0
TOTAL	492,063	34,706	148,108	187,187	221,033	229,767	103,342	34,254	15,642	6,149	3,938
NET CHANGE (By Year 2000)		(+) 113,402		(+) 33,846		(-) 126,425		(-) 18,612		(-) 2,211	

Source: 1975 Resource Inventory Data

mechanical disturbance would alter topsoil, thus destroying or altering the existing biotic community and soil/vegetation relationships. Natural drainage patterns would be diverted in some areas.

11. Increased Erosion

On areas left exposed after construction of range improvement projects, there would be a localized increase of soil erosion by wind and water. This erosion would decrease as vegetation is reestablished (approximately two growing seasons). Animal concentrations around water sources could cause increased surface disturbance; however, erosion from these small local areas is difficult to quantify. Water development in the Penistaja-Berent-Sandstone soil association or adjacent to vertical banked drainages is particularly susceptible to this impact. Short-term impacts would involve 1,069 acres; long-term impacts would include 85 of these acres.

Source of Impact: Vegetative Manipulation

12. Soil Disturbance

Vegetative manipulation through sagebrush burning on four allotments (2,045 acres) and through rotary brushcutting on two allotments (480 acres) would result in minimal disturbance of the soil surface. Burning would increase soil surface exposure to wind and water erosion; rotary brushcutting would cause some mechanical disturbance of the soil by equipment. These are short-term impacts that would decrease as revegetation takes place. The manipulation occurs on Billings-Persayo and Travessilla-Persayo soil associations; a short-term increase in soil fertility would result from the release of nutrients held in the sagebrush before burning. The actual amounts of nutrients which enter the soil exchange complex would be difficult to quantify because of an unknown amount of nutrient loss through wind and water erosion. Because this impact is extremely localized within a much larger area, the cumulative effect would be negligible.

13. Increased Erosion

There would be a localized, short-term increase in wind and water erosion from the 2,045 acres exposed by sagebrush burning and rotary brushcutting. Because of the small amount of erosion which would occur, the impact is negligible on soils.

Water Resources

Source of Impact: Rest and Deferred Rotation Grazing Systems

14. Decreased Runoff

Improved vegetative vigor resulting from grazing management systems would increase total ground cover and thereby reduce surface runoff peaks (see Table III-6 and Vegetation, Impact 21). No change is anticipated on steep and rocky or barren sites (most barren sites are badland type topography).

Different soil associations would exhibit variations in their response to the proposed action. The average reduction for ten year peak flows from Litle-Las Lucas soils, for example, would be about 50 percent. In contrast, the reduction of flow from the Penistaja-Berent Sandstone would be only three percent. The amount of rock outcrop and basic infiltration characteristics are mainly responsible for these variations.

15. Increased Water Retention

Reduced runoff means that more precipitation would enter the soil. This water would then become available for plant growth or ground water recharge. These effects cannot be quantified at the present time, but they would result in beneficial, long-term, area-wide impacts upon plant growth and availability of groundwater.

16. Less Water Available for Reservoirs

Less runoff (especially on the Christianburg- Navajo, Litle-Las Lucas, and Billings-Persayo soils) would result in less water for the filling of stockwater reservoirs and pit tanks. Most existing reservoirs and pit tanks (see Visual C for locations of water developments) are not reliable sources of water; therefore, anticipated decreases in runoff are not expected to significantly change the availability or use of surface water within the area. Reductions in runoff are not expected to affect downstream water users. Slightly reduced runoff would be an adverse, longterm, localized impact on water availability for existing reservoirs and stock water tanks.

Table III-6

ESTIMATES OF PEAK RUNOFF FROM THE TEN YEAR STORM AFTER IMPLEMENTING THE PROPOSED ACTION (YEAR 2000)

(From Watersheds One Square Mile In Size)

		1/ Computed Peak Flows CFS/mi2		Percent
Vegetative Sub-Type	Acres	Existing Situation	After Proposed Action	Change
Ponderosa pine	8,638	110	100	-9
Big sagebrush	95,145	80	65	-19
Four-wing saltbush	18,428	180	135	-25
Greasewood	8,974	205	170	-21
Shortgrass	150,126	200	145	-28
Broom snakeweed	14,693	220	150	-32
Pinyon-juniper	181,716	125	90	-28
Steep and Rocky	10,436	550	550	0
Barren	3,864	445	445	0

		2/ Computed Peak Flows, CFS/mi2		Percent
Soil Association	Acres	Existing Situation	After Proposed Action	Change
Christianburg-Navajo	32,265	180	100	-44
Litle-Las Lucas	94,030	140	70	-50
Penistaja-Berent-Sandstone	88,675	160	155	-3
Basalt Outcrop-Cabezon-Torreon	31,495	300	260	-13
Billings-Persayo	93,355	140	115	-18
Travessilla-Persayo	172,096	200	150	-25

1/ Weighted average from six soil associations.
2/ Weighted average from nine vegetative sub-types.

Source: U.S. Department of Agriculture; Soil Conservation Service;
Forest Service; Energy Resources Satellite, 1974
BLM Staff Hydrologist
BLM Staff Soil Scientist

17. IMPROVED WATER QUALITY

Lower peak runoff flows, combined with the protective effects of increased ground cover, would also result in less erosion and subsequent reductions in sediment yield. The quality of surface waters should improve slightly, since reduced sediment loads (see Chapter III, Impact No. 7 and Table III-4 which shows reductions in sediment yields varying from 180 to 540 tons per square mile per year) provide less opportunity for soil salts to dissolve. This would be an area-wide, long-term, beneficial impact. There is no way to quantify this with existing data. The amount of change is not expected to have any effect upon use of water. Reduced surface runoff is not expected to affect groundwater quality.

18. INCREASED GROUNDWATER WITHDRAWAL

Almost all of the water needed for livestock and wildlife to utilize additional AUMs under the proposed action would come from groundwater. Groundwater withdrawals are expected to reach about 115 acre feet annually by the year 2000. This would be an increase of 60 acre feet per year over existing withdrawal. Increased pumping would be offset to some extent by improved recharge conditions due to increased cover. The measurable effect of increased withdrawals and improved recharge conditions on the quantity of available groundwater are difficult to predict. There is a possibility that increased pumping of groundwater could decrease water quality by causing salt water intrusion into fresh water aquifers from surrounding saline aquifers. There is also the possibility of mixing fresh and salt water if wells provide a connection between aquifers. Possible salt water intrusions would be a long-term, area-wide, adverse impact by lowering the quality of the groundwater or possibly making it impotable for livestock, wildlife, or human consumption.

Source of Impacts: Construction and Physical Presence of Range Improvement Projects

19. INCREASED WATER EROSION

Construction of range improvements would cause localized water erosion and sediment yield on exposed areas (1,069 acres short-term; 85 long-term). Because the construction would be extremely localized, and is scattered throughout a much larger area, this adverse impact would be negligible.

Source of Impact: Vegetative Manipulation

20. INCREASED WATER EROSION

Vegetative manipulation through sagebrush burning on four allotments (2,045 acres) would cause a localized, short-term increase in erosion by water. Because of the small area involved, this adverse impact is negligible.

Vegetation

Source of Impact: Rest and Deferred Rotation Grazing Systems

21. IMPROVED VEGETATIVE VIGOR

If the proposal is implemented, the improvement of vegetative vigor would be one of the most significant impacts. Vegetative responses on existing AMP s and in the San Luis Watershed Study support this conclusion. Expected vegetative response has been discussed at length in Chapter II-B, Future Environment, Vegetation, Areas with AMPs. The discussion in Chapter II-B for Areas with AMPs (which would continue with or without the proposal) also applies to the proposal, as response is predicted to be the same. Appendix III-2 displays a number of vegetative impact factors as they are related to grazing treatments, key forage species and vegetative subtypes. Impacts are illustrated qualitatively with a relative range for an average climatic year. The grazing systems designed for the various AMPs of the proposed action are based on the physiological responses and needs of the key forage species during four periods:

Spring growing season—March 1 to June 30
Summer growing season—July 1 to October 15
Fall dormant season—October 16 to November 30
Winter dormant season—December 1 to February 28

Dates for development stages of key forage grasses and shrubs, as well as cool or warm season designations for the Rio Puerco ES Area are shown in Table III-7. This table also shows the species which reproduce vegetatively. Vegetative reproduction may be as important as seed reproduction.

During the spring growing season, cool-season grasses, sedges, forage shrubs and some warm-season grasses begin growth. Soil temperatures need to reach 40 to 50 degrees F. The cool-season species develop in an environment where temperature is the principal factor limiting growth.

Table III-7

PHENOLOGICAL DEVELOPMENT STAGES FOR KEY FORAGE PLANTS
RIO PUERCO ES AREA

Species	Seasonal Character	Start Growth	Flower-ing	Peak of Flowering	Seed Ripe	Seed Disseminate
GRASSES						
*Western wheatgrass *Agropyron smithii*	Dual	4/1	5/20 8/1	6/15 8/20	7/31 9/15	9/1 10/1
Crested wheatgrass *Agropyron cristatum*	CS	3/15	5/15	6/1	7/1	7/30
*Blue grama *Bouteloua gracilis*	WS	5/1	7/15	8/20	9/15	10/1
Pine dropseed *Blepharoneuron tricholepis*	WS	4/1	6/1	7/15	9/1	10/15
Arizona fescue *Festuca arizonica*	CS	4/15	6/1	7/1	9/1	10/15
*Galleta *Hilaria jamesii*	Dual	5/15 7/15	6/15 8/15	7/1 9/1	7/15 9/15	9/30
Prairie junegrass *Koelaria cristata*	CS	4/10-	5/1	6/1	7/1-	8/1-
Indian ricegrass *Oryzopsis hymenoides*	Dual	3/15	5/15 7/15	6/1 8/15	6/15 9/15	7/1 9/30
Littleseed ricegrass *Oryzopsis micrantha*	CS	3/20	5/15	6/1	7/1	8/30
Mutton bluegrass *Poa fendleriana*	CS	3/15	4/15	5/15	6/1	6/15
Mountain muhly *Muhlenbergia montana*	WS	4/15	8/15	9/15- 9/30	10/15	10/30
Alkali sacaton *Sporobolus airoides*	Dual	3/15	5/15- 8/15	5/30 8/30	6/15 9/15	6/30 9/30
Sand dropseed *Sporobolus cryptandrus*	WS	5/20	7/30	8/15	10/15	10/30
Spike dropseed *Sporobolus contractus*	WS	5/20	7/30	8/15	10/15	10/30
GRASS-LIKE PLANTS						
**Carex spp.*	CS	5/1	5/30	6/15	7/15	8/30
SHRUBS						
Fringed sage *Artemisia frigida*	WS	3/1	8/15	9/1	10/1	10/31
Black sagebrush *Artemisia nova*	WS	3/15	8/15	9/1	10/1	10/31
Four-wing saltbush *Atriplex canescens*	WS	3/15	7/15	8/15	8/30	10/15
Mountain mohogany *Cercocarpus montanus*	CS	3/10	4/15	4/30	8/1- 9/1	10/1
Mexican cliffrose *Cowania mexicana*	Dual	3/1	5/15- 8/1	5/30 8/30	10/1	11/30
Winterfat *Eurotia lanata*	CS	3/15	4/15	4/30	8/30	10/1
Gambel oak *Quercus gambelii*	WS	3/1	5/20	6/15	9/25	10/10
Bitterbrush *Purshia tridentata*	CS	3/1	4/15	4/30	7/1	9/15
Skunkbush *Rhus trilobata*	CS	3/15	4/15	4/30	7/1	7/30

Dual - May be either season, depending primarily on available moisture.
WS - Warm season species.
CS - Cool season species.
*Species in which vegetative reproduction by means of underground root stems or rhizomes is common.

Source: Plant and Range Ecosystem Data
Texas Tech University

Comparative Phenologies of 15 Shrub and Semi-shrub Species In the Southwest
Technology Application Center
University of New Mexico

These species utilize winter and spring moisture; the period from about April 10 to June 1 is the most critical. The first part of this period is important for growth and production, and the latter portion is important for seed maturation and dissemination.

During the summer growing season, warm-season species make their best growth. The surge of growth begins when the soil warms to 60 to 65 degrees F. Warm-season species grow upon response to temperature and moisture. This is usually at a moderate rate during April, and then decreases to a low rate during May and June. If no precipitation falls, they may go into a period of semi-dormancy. From mid-July through early August, warm-season species begin to develop flower stems, and their height increases rapidly. In dry years, however, few flower stalks develop, and plant growth generally corresponds to the timing of seasonal precipitation. Rains occurring later than usual may delay growth, but there is good evidence that earlier rains do not result in appreciable growth of warm-season species. If warm-season species are to be favored in the grazing system, they should be protected from grazing from approximately July 15 to October 15.

The fall dormant period is primarily important as the time when the seed of warm-season species is disseminated. Other factors are similar to those discussed for the winter period. During the winter dormancy period, most species are not actively growing. Some species retain some green color at the stem nodes and twigs, and appear to remain vegetatively active and somewhat succulent during most years. Repeated grazing, especially on key forage shrubs, from mid-October to mid-April results in damage to these species. Some moderate grazing during the winter may stimulate plant growth the following spring. Removal of plant material containing carbohydrate reserves may increase photosynthetic activity to replace the lost material.

Because of the various needs of the cool and warm-season species, several different treatments have been included in the proposed grazing systems. These treatments provide for the physiological requirements of key forage species selected for each vegetative sub-type (Technical Application Center, 1976, and Texas Tech University, 1976). Overall improvement in vegetative vigor would be an area-wide, long-term, beneficial impact.

22. INCREASED FORAGE PRODUCTION

Predicted vegetative response to the proposed grazing systems was estimated on the basis of vegetative sub-types, general precipitation required, and the soil association occurring on each allotment. The following studies were also used in determining vegetative potential:

—1975 BLM Resource Inventory
—Range Plant and Range Ecosystem Data, Texas Tech University, 1976
—Studies on Grazing Impacts and Vegetation in the Rio Puerco, New Mexico State University, 1976
—Soil Survey, Cabezon Area, New Mexico, USDA Soil
—Conservation Service, et al., January, 1968
—San Luis Watershed Study Data, Rocky Mountain Forest and Range Experiment Station, Albuquerque Branch, 1972

The San Luis Watershed Study, located within the ES Area, analyzed the effects of summer deferred grazing for 20 years, and is the major source for determining vegetative potential (see Visual A for location of the San Luis Watershed Study, and Appendix I-2 for vegetative response). An elaboration of the San Luis Watershed Study is included in Chapter II, Future Environment, Vegetation. From this information it was projected that there would be an increase in forage production on all lands (public, state, private) from 69,446 to 121,788 AUMs by the year 2000. (Both figures of AUMs include all lands within the area used in conjunction with public lands and are computed at 50 percent utilization of key forage species for grazing animals.) Table III-8 shows potential forage production by vegetative sub-type and soil association for each allotment. Soils in each association were ranked according to characteristics desirable for vegetative production, and given a relative value that was reflected in potential production figures (see Appendix I-1, Methodology). These values were determined by professional judgement and experience in the ES Area and by use of the Cabezon Area Soil Survey (USDA, 1968). Table III-9 summarizes this information by vegetative sub-type. Within soil associations, vegetative sub-types may vary in potential production capabilities as influenced by climatic, topographic, or other features. Production figures (present and potential AUMs) include all forage available for livestock and wildlife. An equal amount of forage would remain on the ground for other resource objectives. Increased forage production would be an area-wide, long-term, beneficial impact.

Table III-8

PRESENT AND POTENTIAL FORAGE PRODUCTION FOR AMP AND NON-AMP AREAS,

BY ALLOTMENT, SOIL ASSOCIATION AND VEGETATIVE SUB-TYPES

							Potential Production[b]																	
		Soil	Association		Present AUM	Total Potential AUM	Ponderosa-pine		Big Sagebrush		Four-wing Saltbush		Greasewood		Shortgrass		Broom Snakeweed[c]		Pinyon-Juniper		Steep & Rocky		Barren	
Allotment Name	No.	Association	Acres	AUMs	Production[a]	Production[b]	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs
Corrales Tierra	55	*	784		87	170					221	73			68	24	33	3	462	70				
		2	563	116							133	44			27	14	33	3	370	55				
		5	221	54							88	29			41	10			92	15				
Senorito	19	*	1,797		274	483			425	99			353	112	765	240			199	30	55	2		
		1	590	184									353	112	237	72								
		2	1,207	299					425	99					528	168			199	30	55	2		
Mesa Portales	17	*	2,857		548	913	58	5	1,338	410			36	15					1,425	483				
		3	762	242			58	5	134	42									570	195				
		5	2,095	671					1,204	368			36	15					855	288				
Nacimiento	14	5	2,530	770	438	770			720	239			85	46	157	116			1,455	354	70	15		
Ridge Top	24	2	1,790	585	347	585			1,015	353									655	232	120	0		
Salado-Tapia	51	2	4,795	874	479	874					34	19			2,665	481	961	199	1,135	175				
Arroyo Alamito	45	5	3,710	1,492	751	1,492					214	98			3,487	1,391			9	3				
Arroyo Piedra Parada	54	*	5,073		664	1,256			92	18	398	152			2,205	660			2,372	426	6	0		
		5	2,790	682					49	9	219	82			1,207	359			1,311	232	4	0		
		2	2,283	574					43	9	179	70			992	301			1,067	194	2	0		
Cachulie	39	*	10,233		1,819	3,594					851	246	97	8	8,573	3,180	623	150	89	10				
		1	1,135	284							851	246	97	8			187	30						
		2	2,856	1,036											2,568	972	249	61	39	3				
		5	6,242	2,274											6,005	2,208	187	59	50	7				
Cebo Community	33	6	7,920	2,802	1,430	2,802			1,465	249	3,303	1,514	638	161	1,508	818	188	6	661	37	157	17		
Coal Creek**	29	*	7,627		1,039	1,940			145	49			380	126	1,892	791			4,715	927	399	47	96	0
		1	380	126									380	126										
		3	4,637	1,308					145	49					1,892	791			2,600	468				
		5	2,610	506															2,115	459	399	47	96	0
El Banquito**	49	*	14,725		1,670	3,230	604	45	836	94	1,041	816			4,376	1,574	56	9	7,812	692				
		4	9,633	1,705			604	45	586	56	551	326			2,407	790	17	3	5,468	485				
		6	5,092	1,525					250	38	490	490			1,969	784	39	6	2,344	207				
Fork Rock Mesa	16	3	2,400	412	206	412			422	62									1,931	350	34	0	13	0
Forty-four	18	*	4,685		996	1,658	95	12	1,984	831			589	176	445	309			1,403	323	169	7		
		1	767	299									589	176	178	123								
		2	1,945	840					1,391	587					267	186			287	67				
		5	1,973	519			95	12	593	244									1,116	256	169	7		
Gypsum Hill	61	*	4,634		385	770					61	37			4,078	696			236	13	240	23	19	1
		2	1,628	550							50	30			1,224	491			95	5	240	23	19	1
		5	3,006	220							11	7			2,854	205			141	8				
Lagunitas	12	*	2,965		470	872	40	10	1,282	162			59	30					1,482	667			102	3
		1	59	30									59	30										
		2	129	17					129	17														
		5	2,777	825			40	10	1,153	145									1,482	667			102	3

							Potential Production[b]																	
							Ponderosa-pine		Big Sagebrush		Four-wing Saltbush		Greasewood		Shortgrass		Broom Snakeweed[a]		Pinyon-Juniper		Steep & Rocky		Barren	
Allotment Name	No.	Soil Association	Association Acres	Association AUMs	Present AUM Production	Total Potential AUM Production	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs
Rio Salado Community	59	*	10,937		1,156	2,079					758	267	123	17	3,841	1,086	7	0	3,924	586	1,750	97	534	26
		1	3,315	940							425	160	123	17	2,650	758							117	5
		2	7,622	1,139							333	107			1,191	328	7	0	3,924	586	1,750	97	417	21
Rock House	60	5	14,712	3,006	1,707	3,006					954	588			7,790	1,671			5,542	721	426	26		
San Luis Community**	38	*	5,059		920	1,643			44	11	521	334	336	45	1,871	717	292	47	1,995	489				
		1	857	379							521	334	336	45										
		2	792	182					44	11					240	73	292	47	216	51				
		6	3,410	1,082											1,631	644			1,779	438				
San Ysidro Pasture	46	5	5,490	1,480	756	1,480					90	55			4,613	1,332			787	93				
Valle San Ysidro**	15	3*	5,596	481	335	481			4,592	375									927	106			77	0
Chico Crossing	43	*	15,339		2,002	3,613	62	17			407	149	340	23	6,134	2,070	2,118	302	5,901	1,021	377	31		
		2	4,678	1,154							225	89	231	14	2,605	838	1,617	213						
		4	2,871	455			62	17											2,432	407	377	31		
		6	7,790	2,004							182	60	109	9	3,529	1,232	501	89	3,469	614				
Continental Divide**	1	6	12,019	2,414	1,666	2,414			6,889	1,729									5,021	685	19	0	90	0
Dry Springs**	5	*	6,976		880	1,442	589	79	2,173	553									3,944	794	233	16	37	0
		3	3,533	724			589	79	1,551	389									1,123	240	233	16	37	0
		6	3,443	718					622	164									2,821	554				
Eagle Mesa	23	*	15,745		2,007	3,467	232	24	5,518	833					2,433	856			7,271	1,746	166	8	125	0
		2	4,214	1,108					1,656	252					2,433	856							125	0
		3	11,531	2,359			232	24	3,862	581									7,271	1,746	166	8		
Guadalupe Community	47	*	9,813		1,169	2,381					268	76			5,561	1,604	719	99	2,837	521	428	81		
		1	1,070	360							236	69			834	291								
		2	8,743	2,021							32	7			4,727	1,313	719	99	2,837	521	428	81		
Penistaja**	11	*	24,608		3,984	6,030	381	55	13,929	3,579			325	61	635	57			8,053	2,278	454	0	831	0
		2	1,997	424					1,672	363			325	61										
		3	22,611	5,606			381	55	12,257	3,216					635	57			8,053	2,278	454	0	831	0
Piedra Lumbre**	28	*	7,917		1,290	2,133			3,156	821					847	340			3,914	972				
		2	1,806	550					1,451	414					355	136								
		3	6,111	1,583					1,705	407					492	204			3,914	972				
Torreon Wash	35	6	8,075	2,016	1,090	2,016					935	277	366	41	2,550	776	171	4	3,896	895	157	23		
Twin Butte	34	6	12,610	2,028	1,157	2,028			1,981	172	350	101	255	38	4,137	984	1,249	71	4,340	650			298	12
Brandy	10	*	28,571		4,206	7,193	365	117	6,133	2,150	284	129	1,376	320	6,016	2,566	1,565	285	12,073	1,589	723	37	36	0
		1	1,026	299							105	51	551	162			370	86						
		2	3,056	1,002					1,227	336					1,204	521	626	115						
		3	7,270	1,788			365	117	3,066	1,124									3,622	536	217	11		
		5	3,758	1,463					1,840	660	114	39			1,804	764								
		6	13,460	2,641							65	39	825	158	3,008	1,281	569	84	8,451	1,053	506	26	36	0
Starr**	4	6	16,124	3,385	2,194	3,385	792	103	8,432	1,782			98	16					5,986	1,459	620	25	196	0
Ignacio Chavez Grant**	50	*	24,668		4,747	8,564	3,329	906			759	651			7,007	2,813	912	296	12,515	3,893	146	5		
		2	8,023	3,547							759	651			4,833	2,259	912	296	1,519	341				
		4	16,645	5,017			3,329	906							2,174	554			10,996	3,552	146	5		
Chiuilla Community**	7	6	9,881	3,232	2,029	3,232	1,669	427	3,700	1,207			161	44	65	16			4,286	1,538				
Elk Springs	30	5	3,141	684	350	684	48	2	161	9									2,561	654	371	19		

Allotment Name	No.	Soil Association	Association Acres	Association AUMs	Present AUM Production	Total Potential AUM Production	Potential Production[b] Ponderosa-pine Acres	AUMs	Big Sagebrush Acres	AUMs	Four-wing Saltbush Acres	AUMs	Greasewood Acres	AUMs	Shortgrass Acres	AUMs	Broom Snakeweed[a] Acres	AUMs	Pinyon-Juniper Acres	AUMs	Steep & Rocky Acres	AUMs	Barren Acres	AUMs
Ojo de los Pinos**	8	*	6,317		1,160	1,847	374	77	2,855	866									2,732	898	156	6	200	0
		3	4,113	1,234			374	77	1,998	609									1,585	542	156	6		
		6	2,204	613					857	257									1,147	356			200	0
Pelon**	3	6	9,355	1,642	893	1,642			4,363	753			177	30					4,012	859			803	0
San Pablo	20	*	4,506		763	1,332			1,302	345			123	5	1,372	793			1,709	189				
		1	255	93									123	5	132	88								
		2	2,086	897					1,016	277					1,070	670								
		5	2,165	342					286	68					170	85			1,709	189				
Shroyer**	2	6	4,848	1,281	773	1,281			1,965	487									2,883	794				
Arroyo Empedrado	36	*	4,535		648	1,265					183	104	321	36	2,276	948	166	15	1,301	139	288	23		
		6	2,787	619							110	62	192	21	911	374	100	9	1,301	139	173	14		
		2	1,748	646							73	42	129	15	1,365	574	66	6			115	9		
Azabache	42	*	21,198		2,701	5,129			273	8			1,211	181	14,757	4,038			4,800	896	157	6		
		6	18,091	4,381					162	6			1,211	181	12,543	3,429			4,080	761	95	4		
		4	3,107	748					111	2					2,214	609			720	135	62	2		
Banco de la Casa	52	2	6,627	1,324	722	1,324					1,208	256			2,168	426	1,709	368	1,290	274	252	0		
Cabezon Peak	44	*	12,063		1,762	3,394					736	580			5,364	1,723	1,303	328	4,599	761			61	2
		1	1,980	814							736	580					261	82	983	152				
		2	10,083	2,580											5,364	1,723	1,042	246	3,616	609			61	2
Canon del Camino	53	2	5,025	975	512	975					347	100			2,016	455			2,662	420				
Cerro Cuate	41	*	3,926		716	1,448					370	283			2,943	970	56	12	471	179	86	4		
		1	627	352							333	255			294	97								
		2	3,299	1,096							37	28			2,649	873	56	12	471	179	86	4		
Cucho Arroyo	57	*	5,401		541	1,002					170	82	441	23	1,967	497			2,652	395	171	5		
		2	1,260	206							17	9	88	4	590	152			565	41				
		5	4,141	796							153	73	353	19	1,377	345			2,087	354	171	5		
Dry Well	27	*	11,729		1,287	2,232			3,625	738					2,955	726			5,149	768				
		2	6,270	1,392					3,625	738					2,645	654								
		3	5,459	840											310	72			5,149	768				
Horn Arroyo**	9	*	4,757		667	913			3,838	769									778	144	8	0	133	0
		3	3,279	657					2,687	541									584	116	8	0		
		6	1,478	256					1,151	228									194	28			133	0
Lost Valley**	40	*	12,104		2,827	4,601					1,334	233	209	100	10,159	4,171	144	65	258	32				
		1	3,067	755							1,334	233	209	100	1,524	422								
		2	2,736	1,334											2,540	1,273	108	45	88	16				
		5	6,301	2,512											6,095	2,476	36	20	170	16				
Mesa Cortada	48	6	6,252	1,544	772	1,544			199	21	268	220			4,460	903			1,262	398	63	2		
North San Luis Mesa	37	*	5,795		728	1,326			588	101	270	32			2,938	928	27	4	1,842	244			130	17
		1	364	54					88	21	270	32					6	1						
		2	553	206					89	11					443	192	21	3						
		5	1,905	503					235	39					1,615	457							55	7
		6	2,973	563					176	30					880	279			1,842	244			75	10
Pipeline**	56	*	13,605		2,075	3,569			581	131	1,750	786			5,413	1,480	2,080	441	3,182	716	599	15		
		2	3,293	954							762	320			1,678	453	853	181						
		5	10,312	2,615					581	131	988	466			3,735	1,027	1,227	260	3,182	716	599	15		

						Total	Potential Production[b]																	
Allotment Name	No.	Soil Association	Association		Present AUM Production	Potential AUM Production	Ponderosa-pine		Big Sagebrush		Four-wing Saltbush		Greasewood		Shortgrass		Broom Snakeweed[a]		Pinyon-Juniper		Steep & Rocky		Barren	
			Acres	AUMs			Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs
Mighty Mite**	58	*	1,111		132	253									265	67	37	3	809	183				
		2	482	108											186	48	37	3	259	57				
		5	629	145											79	19			550	126				
Tres Hermanos**	6	*	4,016		765	1,274			1,307	493									2,709	781				
		3	1,729	582					889	346									840	236				
		6	2,287	692					418	147									1,869	545				
Canada Candelaria	31	*	8,617		1,125	1,735			3,261	544			143	15	544	406			4,486	770	183	0		
		3	4,253	1,037					1,957	329					326	244			1,787	464	183	0		
		6	4,364	698					1,304	215			143	15	218	162			2,699	306				
Los Pinos Arroyo	26	5	5,040	1,210	721	1,210			1,782	600					265	16			2,136	553	857	41		
Cerro Colorados	32	*	17,989		1,790	3,176			2,553	226	343	101	726	105	6,420	1,653	277	45	7,181	1,035	406	11	83	0
		1	449	92							103	30	291	53			55	9						
		3	3,267	392					708	68									2,153	313	406	11		
		6	14,273	2,692					1,845	158	240	71	435	52	6,420	1,653	222	36	5,028	722			83	0
Bama	21	5	96	12	7	12			30	6			6	2					60	4				
Molino	13	5	80	18	9	18													80	18				
Rock Ridge	25	5	1,185	182	96	182			111	19					125	35			859	128	90	0		
San Miguel	22	5	80	12	6	12			80	12														
TOTALS ***			492,063	121,788	69,446	121,788	8,638	1,879	95,145	21,906	18,428	8,359	8,974	1,776	150,126	47,403	14,693	2,752	181,716	37,060	10,436	592	3,864	61

[a] Present AUM production = Grazing Capacity estimate from BLM 1975 transect data.
[b] Potential AUM production = Predicted production, year 2000.
[c] Broom snakeweed is expected to change to shortgrass; however, acres and AUMs of broom snakeweed are not combined with shortgrass in this table.

*Line entry is total acres for **allotment** and total acres for each vegetative sub-type.
**Denotes allotments that presently have AMPs.
***Forty-three acres of cropland are not included in vegetative sub-type acreage.

Sources: San Luis Watershed Study Data
Rocky Mountain Forest and Range Experiment Station, Albuquerque Branch
1975 BLM Resource Inventory
Range Plant and Range Ecosystem Data, Texas Tech University
New Mexico State University

Table III-9

PREDICTED FORAGE PRODUCTION BY VEGETATIVE SUB-TYPES WITH THE PROPOSED ACTION ON TOTAL ES AREA ACREAGE[1]

Year 2000

Vegetative Sub-Type	Acres	Production In AUMs[2]
Ponderosa pine	8,638	1,879
Big sagebrush	95,145	21,906
Four-wing saltbush	18,428	8,359
Greasewood	8,974	1,776
Shortgrass	164,819	50,155
Broom snakeweed[3]	0	0
Pinyon-juniper	181,716	37,060
Steep and Rocky	10,436	592
Barren	3,864	61
Subtotal	492,020	121,788
Cropland	43	
Total ES Area Acreage	492,063	

[1] Acres and AUMs are for public lands and all lands used in conjunction with public lands.

[2] AUMs estimated at 50% level of utilization of key forage species for grazing animals.

[3] Broom snakeweed is expected to change to shortgrass. Acres and AUMs of broom snakeweed are combined into the shortgrass totals in this table.

Source: Summarized from Table III-8.

23. INCREASED TOTAL GROUND COVER

Under the proposed action total ground cover (live vegetation, litter) by the year 2000 would improve as vigor gains are made. This would result in a forage production increase which could also increase litter by 50 to 100 percent. This would occur because, along with rotation grazing systems, livestock forage utilization would be limited to the moderate level (40 to 60 percent). During the initial period, utilization of up to 67 percent of key forage species would occur on allotments with rest rotation grazing systems with three or more pastures. Increased total ground cover would be an area-wide, long-term, beneficial impact. Estimated forage vegetation cover changes are displayed in Chapter II, Table II-44 Future Areas With AMPs as compared to Future Areas Without AMPs.

24. IMPROVED RANGE CONDITION

Range condition, as used in this document, is the relative position of a range with regard to an attainable standard on the basis of site potentialities. Range condition is determined by interpreting the ability of vegetation (quality and quantity) to provide sustained livestock forage and soil stability. The present characteristics of vegetation and soil are compared to established standards attainable under proper livestock grazing management.

Standards are based on vegetation composition and the soil surface factor (SSF; see BLM Manual 7317.12 and 7322.11B8 for complete description of method). Each species is classified as desirable, intermediate and least desirable, for cattle, sheep, horses and burros. Appendix III-3 contains definitions of specific condition and composition classes as well as a list of desirable, intermediate and least desirable key forage species of the Rio Puerco ES Area.

Table III-10 was prepared for each allotment and vegetative sub-type within the allotment. The table illustrates estimated range condition for three circumstances: the present, the future without the proposed action and the future with the proposed action. Table III-11 displays range condition information and is a summary of Table III-10. Range condition for each vegetative subtype is displayed for the present, for the future without the proposal and for the future with the proposal. Within each of the three categories, the information is further subdivided into areas with and without existing AMPs. Table III-11 shows that vegetation in areas with AMPs would improve substantially over time, while the vegetation in areas without AMPs would not improve. Improved range condition would be an area-wide, long-term, beneficial impact.

25. INCREASED WILDFIRES

Increased litter resulting from the rest and deferred rotation grazing systems would create a receptive environment for wildfire to start and spread. These wildfires may not increase above the current three fires per year, but increased vegetative litter would cause these fires to spread more rapidly and consume more acreage. Fire would cause a localized, adverse impact on affected vegetation prior to initiation of standard fire suppression activities. However, a localized beneficial impact would be improved forage composition by destruction of woody species. This impact would be short-term during each fire but the propensity for larger wildfires would be long-term.

26. INCREASED RIPARIAN VEGETATION

The exclusion of livestock from existing water sources through rotation of pastures would result in increased riparian vegetation. There would be approximately 27 acres in long-term use which could support riparian vegetation. One pit tank would be developed to support proposed grazing systems (see Visual C). Because this area is quite small in comparison with the entire ES Area, this localized, beneficial impact on riparian vegetation would be negligible.

27. INCREASED WATER RETENTION

Increased total ground cover resulting from proposed grazing systems would in turn cause increased water retention. This water would become available for vegetative improvements in vigor and forage production. Increased water retention would be an area-wide, long-term, beneficial impact.

28. IMPROVED WATER QUALITY

Increased total ground cover would also cause decreased sediment yield along with subsequent improved water quality. There is no way to quantify this impact with existing data, but improved water quality would be an area-wide, long-term, beneficial impact on vegetation.

Table III-10

RANGE CONDITION CLASSES BY ALLOTMENT AND BY TOTAL VEGETATIVE SUB-TYPE ACRES

No.	Allotment Name	Vegetative Sub-Type	Acres	Present Range Condition			Future Range Condition Without the Proposal Year 2000			Future Range Condition With the Proposal Year 2000		
				Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
55	Corrales Tierra	Four-wing saltbush	221	221				221		221		
		Shortgrass	68	68				68		101		
	784 Acres	Broom snakeweed	33		33				33		*	
	784 Public Lands	Pinyon-juniper	462		322	140			462		322	140
	Total Acres		784	289	355	140		289	495	322	322	140
49	Senorito	Big sagebrush	425		425				425	425		
		Greasewood	353		353			353		353		
	1,797 Acres	Shortgrass	765		765			765		765		
	683 Public Lands	Pinyon-juniper	199		199				199		199	
		Steep and Rocky	55		55				55		55	
	Total Acres		1,797		1,797			1,118	679	1,543	254	
17	Mesa Portales	Ponderosa pine	58		58			58			58	
		Big sagebrush	1,338	251	786	301	251		1,087	1,037	301	
	2,857 Acres	Greasewood	36		36				36		36	
	1,996 Public Lands	Pinyon-juniper	1,425	675	750			994	431	994	431	
	Total Acres		2,857	926	1,630	301	251	1,052	1,554	2,031	826	
14	Nacimiento	Big sagebrush	720		498	222		498	222	498	222	
		Greasewood	85			85			85		85	
	2,530 Acres	Shortgrass	157		157				157	157		
	1,418 Public Lands	Pinyon-juniper	1,455			1,455			1,455		714	741
		Steep and Rocky	70			70			70			70
	Total Acres (43 Acres Cropland)		2,487		655	1,832		498	1,989	655	1,021	811
24	Ridge Top	Big sagebrush	1,015		1,015			1,015		1,015		
		Pinyon-juniper	655		655			642	13	642	13	
	1,790 Acres	Steep and Rocky	120			120			120			120
	1,150 Public Lands											
	Total Acres		1,790		1,670	120		1,657	133	1,657	13	120
51	Salado Tapia	Four-wing saltbush	34		34				34	34		
		Shortgrass	2,665			2,665			2,665	3,626		
	4,795 Acres	Broom snakeweed	961		961				961		*	
	3,183 Public Lands	Pinyon-juniper	1,135	444	691			444	691	1,135		
	Total Acres		4,795	444	1,686	2,665		444	4,351	4,795		
45	Arroyo Alamito	Four-wing saltbush	214			214			214	214		
		Shortgrass	3,487	1,262	2,225			3,487		3,487		
	3,710 Public Lands	Pinyon-juniper	9	9				9		9		
	Total Acres		3,710	1,271	2,225	214		3,496	214	3,710		
54	Arroyo Piedra Parada	Big sagebrush	92		92			92		92		
		Four-wing saltbush	398	398				398		398		
	5,073 Acres	Shortgrass	2,205	1,600		605		1,141	1,064	1,600	605	
	3,631 Public Lands	Pinyon-juniper	2,372	1,712	660			1,712	660	1,712	660	
		Steep and Rocky	6			6			6			6
	Total Acres		5,073	3,710	752	611		3,343	1,730	3,802	1,265	6
39	Cachulie	Four-wing saltbush	851	851				851		851		
		Greasewood	97			97			97		97	
	10,233 Acres	Shortgrass	8,573	8,573			2,010	6,563		9,196		
	10,136 Public Lands	Broom snakeweed	623	623				623			*	
		Pinyon-juniper	89		89				89	89		
	Total Acres		10,233	10,047	89	97	2,010	8,037	186	10,136	97	
33	Cebo Community	Big sagebrush	1,465		1,465			1,465		1,465		
		Four-wing saltbush	3,303		3,303			3,303		3,303		
	7,920 Acres	Greasewood	638			638			638		638	
	7,280 Public Lands	Shortgrass	1,508		1,508			1,508		1,696		
		Broom snakeweed	188			188			188		*	
		Pinyon-juniper	661			661			661		661	
		Steep and Rocky	157		121	36		121	36		121	36
	Total Acres		7,920		6,397	1,523		6,397	1,523	6,464	1,420	36

No.	Allotment Name	Vegetative Sub-Type	Acres	Present Range Condition			Future Range Condition Without the Proposal Year 2000			Future Range Condition With the Proposal Year 2000		
				Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
29	Coal Creek**	Big sagebrush	145		145		145			145		
		Greasewood	380		380			380			380	
	7,627 Acres	Shortgrass	1,892	411	1,481		1,892			1,892		
	5,268 Public Lands	Pinyon-juniper	4,715	271	3,243	1,201	1,873	2,842		1,873	2,842	
		Steep and Rocky	399			399			399			399
		Barren	96			96			96			96
	Total Acres		7,627	682	5,249	1,696	3,910	3,222	495	3,910	3,222	495
49	El Banquito**	Ponderosa pine	604	604			604			604		
		Big sagebrush	836		836		836			836		
	14,725 Acres	Four-wing saltbush	1,041	1,041			1,041			1,041		
	14,725 Public Lands	Shortgrass	4,376	2,065	2,311		4,432			4,432		
		Broom snakeweed	56			56		*			*	
		Pinyon-juniper	7,812	3,860	3,952		7,812			7,812		
	Total Acres		14,725	7,570	7,099	56	14,725			14,725		
16	Fork Rock Mesa	Big sagebrush	422	422				422		422		
		Pinyon-juniper	1,931	351	1,580			351	1,580	1,647	284	
	2,400 Acres	Steep and Rocky	34			34			34			34
	800 Public Lands	Barren	13			13			13			13
	Total Acres		2,400	773	1,580	47		773	1,627	2,069	284	47
18	Forty-four	Ponderosa pine	95	95			95			95		
		Big sagebrush	1,984		1,984			1,857	127	1,857	127	
	4,685 Acres	Greasewood	589		589				589	589		
	2,484 Public Lands	Shortgrass	445	445				445		445		
		Pinyon-juniper	1,403		1,403			1,403		1,403		
		Steep and Rocky	169		169				169		169	
	Total Acres		4,685	540	4,145		95	3,705	885	4,389	296	
61	Gypsum Hill	Four-wing saltbush	61		61				61		61	
		Shortgrass	4,078	297	1,997	1,784	297	1,997	1,784	2,294	846	938
	4,634 Acres	Pinyon-juniper	236			236			236		236	
	4,434 Public Lands	Steep and Rocky	240			240			240			240
		Barren	19			19			19			19
	Total Acres		4,634	297	2,058	2,279	297	1,997	2,340	2,294	1,143	1,197
12	Lagunitas	Ponderosa pine	40		40			40		40		
		Big sagebrush	1,282		1,282			1,282		1,282		
	2,965 Acres	Greasewood	59		59				59		59	
	1,467 Public Lands	Pinyon-juniper	1,482		1,391	91			1,482	1,391	91	
		Barren	102			102			102			102
	Total Acres		2,965		2,772	193		1,322	1,643	2,713	150	102
8	Ojo de los Pinos**	Ponderosa pine	374		374		374			374		
		Big sagebrush	2,855	2,152	703		2,855			2,855		
	6,317 Acres	Pinyon-juniper	2,732	2,596	136		2,732			2,732		
	5,685 Public Lands	Steep and Rocky	156			156			156			156
		Barren	200			200			200			200
	Total Acres		6,317	4,748	1,213	356	5,961		356	5,961		356
3	Pelon**	Big sagebrush	4,363		4,363		4,363			4,363		
		Greasewood	177		177			177			177	
	9,355 Acres	Pinyon-juniper	4,012		3,105	907	3,105	907		3,105	907	
	8,197 Public Lands	Barren	803			803			803			803
	Total Acres		9,355		7,645	1,710	7,468	1,084	803	7,468	1,084	803
20	San Pablo	Big sagebrush	1,302		1,050	252		577	725	1,050	252	
		Greasewood	123			123			123		123	
	4,506 Acres	Shortgrass	1,372		1,372			1,372		1,372		
	2,753 Public Lands	Pinyon-juniper	1,709		1,185	524			1,709	524	1,185	
	Total Acres		4,506		3,607	899		1,949	2,557	2,946	1,560	

Table III-10 (continued)

				Present Range Condition			Future Range Condition Without the Proposal Year 2000			Future Range Condition With the Proposal Year 2000		
No.	Allotment Name	Vegetative Sub-Type	Acres	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
2	Shroyer**	Big sagebrush	1,965	1,585	380		1,965			1,965		
	4,848 Acres	Pinyon-juniper	2,883	1,287	1,596		2,193	690		2,193	690	
	4,573 Public Lands											
	Total Acres		4,848	2,872	1,976		4,158	690		4,158	690	
36	Arroyo Empedrado	Four-wing saltbush	183		94	89			183	183		
		Greasewood	321			321			321		321	
	4,535 Acres	Shortgrass	2,276		1,582	694		791	1,485	1,748	694	
	3,507 Public Lands	Broom snakeweed	166			166			166	*		
		Pinyon-juniper	1,301		196	1,105			1,301	196	1,105	
		Steep and Rocky	288			288			288			288
	Total Acres		4,535		1,872	2,663		791	3,744	2,127	2,120	288
42	Azabache	Big sagebrush	273	273			273			273		
		Greasewood	1,211			1,211			1,211		1,211	
	21,198 Acres	Shortgrass	14,757	5,831	7,908	1,018	5,831		8,926	13,739	1,018	
	17,298 Public Lands	Pinyon-juniper	4,800		4,132	668		2,263	2,537	1,869	2,263	668
		Steep and Rocky	157			157			157			157
	Total Acres		21,198	6,104	12,040	3,054	6,104	2,263	12,831	15,881	4,492	825
52	Banco de la Casa	Four-wing saltbush	1,208		1,208			194	1,014	1,208		
		Shortgrass	2,168	1,043	1,125			1,098	1,070	3,877		
	6,627 Acres	Broom snakeweed	1,709		1,709				1,709		*	
	4,857 Public Lands	Pinyon-juniper	1,290	469		821		469	821	469	821	
		Steep and Rocky	252			252			252			252
	Total Acres		6,627	1,512	4,042	1,073		1,761	4,866	5,554	821	252
44	Cabezon Peak	Four-wing saltbush	736	673	63		673	63		736		
		Shortgrass	5,364	2,848	2,516		52	2,404	2,908	5,613	1,054	
	12,063 Acres	Broom snakeweed	1,303		1,303			211	1,092		*	
	11,139 Public Lands	Pinyon-juniper	4,599		4,551	48		4,261	338	782	3,769	48
		Barren	61			61			61			61
	Total Acres		12,063	3,521	8,433	109	725	6,939	4,399	7,131	4,823	109
53	Canon del Camino	Four-wing saltbush	347		347			347		347		
		Shortgrass	2,016		1,558	458		627	1,389	1,006	1,010	
	5,025 Acres	Pinyon-juniper	2,662			2,662			2,662		138	2,524
	4,943 Public Lands											
	Total Acres		5,025		1,905	3,120		974	4,051	1,353	1,148	2,524
41	Cerro Cuate	Four-wing saltbush	370		233	137			370	370		
		Shortgrass	2,943		1,035	1,908			2,943	1,684	1,315	
	3,926 Acres	Broom snakeweed	56	11	45				56		*	
	2,606 Public Lands	Pinyon-juniper	471		308	163		169	302	169	139	163
		Steep and Rocky	86			86			86			86
	Total Acres		3,926	11	1,621	2,294		169	3,757	2,223	1,454	249
57	Cucho Arroyo	Four-wing saltbush	170		170			170		170		
		Greasewood	441			441			441		441	
	5,401 Acres	Shortgrass	1,967		1,967			859	1,108	859	1,108	
	4,615 Public Lands	Pinyon-juniper	2,652		2,652				2,652		2,652	
		Steep and Rocky	171			171			171			171
	Total Acres		5,401		4,789	612		1,029	4,372	1,029	4,201	171
27	Dry Well	Big sagebrush	3,625	1,405	2,136	84		1,834	1,791	2,488	1,053	84
		Shortgrass	2,955	2,955			166	2,789		2,955		
	11,729 Acres	Pinyon-juniper	5,149	668	4,045	436		668	4,481	1,991	2,722	436
	9,564 Public Lands											
	Total Acres		11,729	5,028	6,181	520	166	5,291	6,272	7,434	3,775	520
9	Horn Arroyo**	Big sagebrush	3,838	1,270	2,568		1,270	2,568		1,270	2,568	
		Pinyon-juniper	778	99	597	82	696	82		696	82	
	4,757 Acres	Steep and Rocky	8		8			8			8	
	4,757 Public Lands	Barren	133			133			133			133
	Total Acres		4,757	1,369	3,173	215	1,966	2,658	133	1,966	2,658	133

No.	Allotment Name	Vegetative Sub-Type	Acres	Present Range Condition Good	Present Range Condition Fair	Present Range Condition Poor	Future Range Condition Without the Proposal Year 2000 Good	Future Range Condition Without the Proposal Year 2000 Fair	Future Range Condition Without the Proposal Year 2000 Poor	Future Range Condition With the Proposal Year 2000 Good	Future Range Condition With the Proposal Year 2000 Fair	Future Range Condition With the Proposal Year 2000 Poor
40	Lost Valley**	Four-wing saltbush	1,334	1,334			1,334			1,334		
		Greasewood	209	209			209			209		
	12,104 Acres	Shortgrass	10,159	6,510	3,649		9,226	1,077		9,226	1,077	
	11,377 Public Lands	Broom snakeweed	144	144							*	
		Pinyon-juniper	258	127		131	127		131	127		131
	Total Acres		12,104	8,324	3,649	131	10,896	1,077	131	10,896	1,077	131
48	Mesa Cortada	Big sagebrush	199			199			199		199	
		Four-wing saltbush	268	268				268		268		
	6,252 Acres	Shortgrass	4,460		4,460			1,352	3,108	1,352	3,108	
	6,252 Public Lands	Pinyon-juniper	1,262	1,237	25			1,262		1,237	25	
		Steep and Rocky	63			63			63			63
	Total Acres		6,252	1,505	4,485	262		2,882	3,370	2,857	3,332	63
37	North San Luis Mesa	Big sagebrush	588		588			588		588		
		Four-wing saltbush	270		270			18	252	270		
	5,795 Acres	Shortgrass	2,938	1,710	808	420		1,710	1,228	2,965		
	4,187 Public Lands	Broom snakeweed	27			27			27		*	
		Pinyon-juniper	1,842		1,842				1,842	805	1,037	
		Barren	130		130			130			130	
	Total Acres		5,795	1,710	3,638	447		2,446	3,349	4,628	1,167	
56	Pipeline**	Big sagebrush	581		581		581			581		
		Four-wing saltbush	1,750	229	433	1,088	662	1,088		662	1,088	
	13,605 Acres	Shortgrass	5,413	2,453	2,891	69	5,839	1,654		5,839	1,654	
	10,860 Public Lands	Broom snakeweed	2,080		1,995	85		*			*	
		Pinyon-juniper	3,182	1,132	2,050		1,787	1,395		1,787	1,395	
		Steep and Rocky	599			599			599			599
	Total Acres		13,605	3,814	7,950	1,841	8,869	4,137	599	8,869	4,137	599
59	Rio Salado Community	Four-wing saltbush	758	507		251		507	251	507	251	
		Greasewood	123		123				123	123		
	10,937 Acres	Shortgrass	3,841	1,100	2,741			1,100	2,741	2,505	1,343	
	9,063 Public Lands	Broom snakeweed	7			7			7		*	
		Pinyon-juniper	3,924		3,620	304		857	3,067	481	3,443	
		Steep and Rocky	1,750		1,480	270		1,480	270		1,480	270
		Barren	534			534			534			534
	Total Acres		10,937	1,607	7,964	1,366		3,944	6,993	3,616	6,517	804
60	Rock House	Four-wing saltbush	954		954			237	717	237	717	
		Shortgrass	7,790		7,790			2,954	4,836	5,670	2,120	
	14,712 Acres	Pinyon-juniper	5,542	2,343	3,199			2,343	3,199	2,343	3,199	
	8,743 Public Lands	Steep and Rocky	426			426			426			426
	Total Acres		14,712	2,343	11,943	426		5,534	9,178	8,250	6,036	426
38	San Luis Community**	Big sagebrush	44		44		44			44		
		Four-wing saltbush	521		521		521			521		
	5,059 Acres	Greasewood	336			336		336			336	
	5,039 Public Lands	Shortgrass	1,871	304	1,567		1,449	714		1,449	714	
		Broom snakeweed	292		292			*			*	
		Pinyon-juniper	1,995		1,995		1,496	499		1,496	499	
	Total Acres		5,059	304	4,419	336	3,510	1,549		3,510	1,549	
46	San Ysidro Pasture	Four-wing saltbush	90	90				90		90		
		Shortgrass	4,613	1,667	2,946			1,667	2,946	4,613		
	5,490 Acres	Pinyon-juniper	787		787				787		787	
	5,490 Public Lands											
	Total Acres		5,490	1,757	3,733			1,757	3,733	4,703	787	
15	Valle San Isidro**	Big sagebrush	4,592	1,737	2,855		4,592			4,592		
		Pinyon-juniper	927		621	306	621	306		621	306	
	5,596 Acres	Barren	77			77			77			77
	4,723 Public Lands											
	Total Acres		5,596	1,737	3,476	383	5,213	306	77	5,213	306	77

				Present Range Condition			Future Range Condition Without the Proposal Year 2000			Future Range Condition With the Proposal Year 2000		
No.	Allotment Name	Vegetative Sub-Type	Acres	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
43	Chico Crossing	Ponderosa pine	62		62			62			62	
		Four-wing saltbush	407	95	86	226		95	312	181	226	
	15,339 Acres	Greasewood	340		340				340		340	
	13,063 Public Lands	Shortgrass	6,134	487	1,137	4,510		1,624	4,510	3,106	5,146	
		Broom snakeweed	2,118		1,055	1,063			2,118		*	
		Pinyon-juniper	5,901	201	4,019	1,681		1,947	3,954	784	5,117	
		Steep and Rocky	377			377			377			377
	Total Acres		15,339	783	6,699	7,857		3,728	11,611	4,071	10,891	377
1	Continental Divide**	Big sagebrush	6,889	3,157	3,732		5,749	1,140		5,749	1,140	
		Pinyon-juniper	5,021	1,195	1,575	2,251	1,195	3,826		1,195	3,826	
	12,019 Acres	Steep and Rocky	19			19			19			19
	10,270 Public Lands	Barren	90			90			90			90
	Total Acres		12,019	4,352	5,307	2,360	6,944	4,966	109	6,944	4,966	109
5	Dry Springs**	Ponderosa pine	589		589			589			589	
		Big sagebrush	2,173		2,043	130	1,672	501		1,672	501	
	6,976 Acres	Pinyon-juniper	3,944	728	2,971	245	3,699		245	3,699		245
	6,056 Public Lands	Steep and Rocky	233			233			233			233
		Barren	37			37			37			37
	Total Acres		6,976	728	5,603	645	5,371	1,090	515	5,371	1,090	515
23	Eagle Mesa	Ponderosa pine	232		232			232			232	
		Big sagebrush	5,518	396	4,323	799		3,916	1,602	3,929	1,589	
	15,745 Acres	Shortgrass	2,433		2,433			2,433		728	1,705	
	12,550 Public Lands	Pinyon-juniper	7,271	527	4,053	2,691		4,580	2,691	4,453	1,729	1,089
		Steep and Rocky	166			166			166			166
		Barren	125			125			125			125
	Total Acres		15,745	923	11,041	3,781		11,161	4,584	9,110	5,255	1,380
47	Guadalupe Community	Four-wing saltbush	268		268			151	117	151	117	
		Shortgrass	5,561	4,337	440	784		4,663	898	5,332	948	
	9,813 Acres	Broom snakeweed	719	669		50		669	50		*	
	6,455 Public Lands	Pinyon-juniper	2,837	1,700	1,137			1,906	931	1,906	931	
		Steep and Rocky	428	348	80			348	80	348	80	
	Total Acres		9,813	7,054	1,925	834		7,737	2,076	7,737	2,076	
11	Penistaja**	Ponderosa pine	381		381		381			381		
		Big sagebrush	13,929	9,609	4,320		13,329	600		13,329	600	
	24,608 Acres	Greasewood	325			325			325			325
	19,619 Public Lands	Shortgrass	635	635			635			635		
		Pinyon-juniper	8,053	1,742	4,831	1,480	4,195	3,858		4,195	3,858	
		Steep and Rocky	454			454			454			454
		Barren	831			831			831			831
	Total Acres		24,608	11,986	9,532	3,090	18,540	4,458	1,610	18,540	4,458	1,610
28	Piedra Lumbre**	Big sagebrush	3,156	835	2,321		3,156			3,156		
		Shortgrass	847	262	585		847			847		
	7,917 Acres	Pinyon-juniper	3,914	187	1,848	1,879	1,758	2,156		1,758	2,156	
	4,140 Public Lands											
	Total Acres		7,917	1,284	4,754	1,879	5,761	2,156		5,761	2,156	
35	Torreon Wash	Four-wing saltbush	935	834		101		834	101	834		101
		Greasewood	366		74	292			366	74	292	
	8,075 Acres	Shortgrass	2,550		2,546	4		387	2,163	387	2,334	
	4,812 Public Lands	Broom snakeweed	171			171			171		*	
		Pinyon-juniper	3,896		415	3,481			3,896		415	3,481
		Steep and Rocky	157			157			157			157
	Total Acres		8,075	834	3,035	4,206		1,221	6,854	1,295	3,041	3,739

Table III -10 (continued)

				Present Range Condition			Future Range Condition Without the Proposal Year 2000			Future Range Condition With the Proposal Year 2000		
No.	Allotment Name	Vegetative Sub-Type	Acres	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
34	Twin Butte	Big sagebrush	1,981		1,878	103		1,878	103	1,878	103	
		Four-wing saltbush	350	36	314			350		350		
	12,610 Acres	Greasewood	255		233	22			255		255	
	10,628 Public Lands	Shortgrass	4,137		4,017	120		4,017	120	5,266	120	
		Broom snakeweed	1,249	1,001	248			1,249			*	
		Pinyon-juniper	4,340		4,340			2,262	2,078	2,262	2,078	
		Barren	298			298			298			298
	Total Acres		12,610	1,037	11,030	543		9,756	2,854	9,756	2,556	298
10	Brandy	Ponderosa pine	365	86	279			86	279	365		
		Big sagebrush	6,133	2,425	3,445	263		4,907	1,226	4,907	1,226	
	28,571 Acres	Four-wing saltbush	284		284			284		284		
	22,368 Public Lands	Greasewood	1,376			1,376			1,376		535	841
		Shortgrass	6,016	1,514	3,019	1,483		1,864	4,152	6,098	1,483	
		Broom snakeweed	1,565		1,565				1,565		*	
		Pinyon-juniper	12,073	7	2,890	9,176		1,940	10,133	2,537	4,119	5,417
		Steep and Rocky	723			723			723			723
		Barren	36			36			36			36
	Total Acres		28,571	4,032	11,482	13,057		9,081	19,490	14,191	7,363	7,017
4	Starr**	Ponderosa pine	792	592		200	592	200		592	200	
		Big sagebrush	8,432	1,429	7,003		7,158	1,274		7,158	1,274	
	16,124 Acres	Greasewood	98			98		98			98	
	12,787 Public Lands	Pinyon-juniper	5,986		4,303	1,683	2,953	1,350	1,683	2,953	1,350	1,683
		Steep and Rocky	620			620			620			620
		Barren	196			196			196			196
	Total Acres		16,124	2,021	11,306	2,797	10,703	2,922	2,499	10,703	2,922	2,499
50	Ignacio Chavez Grant**	Ponderosa pine	3,329	1,775	1,554		2,749	580		2,749	580	
		Four-wing saltbush	759	55	704		759			759		
	24,668 Acres	Shortgrass	7,007	2,420	4,587		5,686	2,233		5,686	2,233	
	24,668 Public Lands	Broom snakeweed	912		682	230		*			*	
		Pinyon-juniper	12,515	12,455	60		12,515			12,515		
		Steep and Rocky	146			146			146			146
	Total Acres		24,668	16,705	7,587	376	21,709	2,813	146	21,709	2,813	146
7	Chiuilla Community**	Ponderosa pine	1,669	613	697	359	1,310	359		1,310	359	
		Big sagebrush	3,700	2,218	1,341	141	3,700			3,700		
	9,881 Acres	Greasewood	161			161		161			161	
	9,389 Public Lands	Shortgrass	65	65			65			65		
		Pinyon-juniper	4,286	2,110	1,316	860	2,944	1,342		2,944	1,342	
	Total Acres		9,881	5,006	3,354	1,521	8,019	1,862		8,019	1,862	
30	Elk Springs	Ponderosa pine	48			48			48		48	
		Big sagebrush	161		161			161		161		
	3,141 Acres	Pinyon-juniper	2,561	382	1,348	831		844	1,717	997	733	831
	2,561 Public Lands	Steep and Rocky	371			371			371			371
	Total Acres		3,141	382	1,509	1,250		1,005	2,136	1,158	781	1,202
58	Mighty Mite**	Shortgrass	265			265			302			302
		Broom snakeweed	37			37			*			*
	1,111 Acres	Pinyon-juniper	809		809			809			809	
	1,111 Public Lands											
	Total Acres		1,111		809	302		809	302		809	302
6	Tres Hermanos**	Big sagebrush	1,307	902	405		1,307			1,307		
	4,016 Acres	Pinyon-juniper	2,709	1,093	1,616		2,016	693		2,016	693	
	3,416 Public Lands											
	Total Acres		4,016	1,995	2,021		3,323	693		3,323	693	
31	Canada Candelaria	Big sagebrush	3,261	1,421	1,840			1,421	1,840	2,059	1,202	
		Greasewood	143		143				143	143		
	8,617 Acres	Shortgrass	544	544				544		544		
	5,219 Public Lands	Pinyon-juniper	4,486		4,486			2,533	1,953	2,533	1,953	
		Steep and Rocky	183			183			183			183
	Total Acres		8,617	1,965	6,469	183		4,498	4,119	5,279	3,155	183

Table III-10 (continued)

Page 7 of 7 Pages

No.	Allotment Name	Vegetative Sub-Type	Acres	Present Range Condition			Future Range Condition Without the Proposal Year 2000			Future Range Condition With the Proposal Year 2000		
				Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
26	Los Pinos Arroyo	Big sagebrush	1,782		1,782			1,782		1,782		
		Shortgrass	265			265			265	265		
	5,040 Acres	Pinyon-juniper	2,136		1,377	759		1,377	759	1,377		759
	2,024 Public Lands	Steep and Rocky	857			857			857			857
	Total Acres		5,040		3,159	1,881		3,159	1,881	3,424		1,616
32	Cerro Colorados	Big sagebrush	2,553		769	1,784			2,553	769	1,784	
		Four-wing saltbush	343	343				343		343		
	17,989 Acres	Greasewood	726		385	341			726	385	341	
	8,050 Public Lands	Shortgrass	6,420	1,171	5,249			4,054	2,366	4,331	2,366	
		Broom snakeweed	277		277				277		*	
		Pinyon-juniper	7,181		5,167	2,014			7,181	1,363	5,818	
		Steep and Rocky	406		406			406		406		
		Barren	83			83			83			83
	Total Acres		17,989	1,514	12,253	4,222		4,803	13,186	7,597	10,309	83
21	Bama	Big sagebrush	30			30			30		30	
		Greasewood	6			6			6			6
	96 Acres	Pinyon-juniper	60			60			60			60
	96 Public Lands											
	Total Acres		96			96			96		30	66
13	Molino	Pinyon-juniper	80			80			80		80	
	80 Acres											
	80 Public Lands											
	Total Acres		80			80			80		80	
25	Rock Ridge	Big sagebrush	111			111			111		111	
		Shortgrass	125	125				125		125		
	1,185 Acres	Pinyon-juniper	859			859			859		859	
	264 Public Lands	Steep and Rocky	90			90			90			90
	Total Acres		1,185	125		1,060		125	1,060	125	970	90
22	San Miguel	Big sagebrush	80		40	40			80		40	40
	80 Acres											
	80 Public Lands											
	Total Acres		80		40	40			80		40	40
SUBTOTAL			492,020	137,541	268,828	85,651	156,694	164,623	170,703	327,101	132,363	32,556
					492,020			492,020			492,020	
	(43 Acres Cropland)		43		43			43			43	
TOTAL			492,063		492,063			492,063			492,063	

*Broom snakeweed is expected to revert to shortgrass by the year 2000 with the proposal or on existing AMPs.

**Current AMP which would continue, with or without the proposal. Range condition classes would be the same for both future categories.

(Range condition class acres were estimated from 1975 BLM Transect Data and include all acreage within allotments.)

Source: AMP Files for Proposed Action
1975 BLM Resource Data

Table III-11

SUMMARY OF RANGE CONDITION CLASSES BY VEGETATIVE SUB-TYPE

	AMP Areas											
	Present				Future Without the Proposal				Future With the Proposal			
Vegetative Sub-Type	Good	Fair	Poor	Total Acres	Good	Fair	Poor	Total Acres	Good	Fair	Poor	Total Acres
Ponderosa pine	3,584	3,595	559	7,738	6,010	1,728	--	7,738	6,510	2,128	--	8,638
Big sagebrush	24,894	33,640	271	58,805	52,722	6,083	--	58,805	80,699	14,322	124	95,145
Four-wing saltbush	2,659	1,658	1,088	5,405	4,317	1,088	--	5,405	15,867	2,460	101	18,428
Greasewood	209	557	920	1,686	209	1,152	325	1,686	1,876	5,926	1,172	8,974
Shortgrass	15,125	17,071	334	32,530	30,071	5,678	302	36,051	129,578	34,001	1,240	164,819
Broom Snakeweed	144	2,969	408	3,521	*				*			
Pinyon-juniper	28,882	36,624	11,025	76,531	53,717	20,755	2,059	76,531	91,817	71,483	18,416	181,716
Steep and Rocky	--	8	2,626	2,634	--	8	2,626	2,634	754	1,913	7,769	10,436
Barren	--	--	2,463	2,463	--	--	2,463	2,463	--	130	3,734	3,864
SUB-TOTAL AMP AREAS	75,497	96,122	19,694	191,313	147,046	36,492	7,775	191,313	327,101	132,363	32,556	492,020
	Non-AMP Areas											
	Present				Future Without the Proposal				Future With the Proposal			
Ponderosa pine	181	671	48	900	95	478	327	900				
Big sagebrush	6,593	25,559	4,188	36,340	524	23,695	12,121	36,340		None Involved		
Four-wing saltbush	4,316	7,689	1,018	13,023	673	8,724	3,626	13,023				
Greasewood	--	2,335	4,953	7,288	--	353	6,935	7,288				
Shortgrass	37,577	63,301	16,718	117,596	8,356	54,408	54,832	117,596				
Broom Snakeweed	2,304	7,196	1,672	11,172	--	2,752	8,420	11,172				
Pinyon-juniper	10,725	63,514	30,946	105,185	--	35,236	69,949	105,185				
Steep and Rocky	348	2,311	5,143	7,802	--	2,355	5,447	7,802				
Barren	--	130	1,271	1,401	--	130	1,271	1,401				
SUB-TOTAL NON-AMP AREAS	62,044	172,706	65,957	300,707	9,648	128,131	162,928	300,707				
GRAND TOTAL**	137,541	268,828	85,651	492,020	156,694	164,623	170,703	492,020	327,101	132,363	32,556	492,020
Private Cropland				43				43				43
TOTAL				492,063				492,063				492,063

*Broom Snakeweed is expected to change to a grass aspect.
**Gross acreage includes private and State intermingled lands.

Source: Summarized from Table III-10

29. LESS EROSION

Increased soil stability resulting from decreased erosion would cause increased vegetative vigor and forage production (see Soils Impacts 6 and 7). Less erosion would be an area-wide, long-term, beneficial impact on vegetation.

30. DECREASED VIGOR

Concentration of livestock in use pastures during the growing season would decrease vigor and forage production of vegetation. Utilization could be up to 67 percent of the key forage species. This effect would be important on pastures used during the growing season, but is predicted to have little effect on the pastures grazed during the dormant period (San Luis Watershed Study, 1972). Pasture rotation would counteract this impact, and after the first grazing cycle, improved quality and forage abundance would make this adverse impact negligible.

Source of Impact: Construction and Physical Presence of Range Improvement Projects

31. REMOVAL OF VEGETATION

Construction of range improvement projects would cause localized, short-term removal of vegetation on 1,069 acres; after revegetation, 85 of these acres would remain in use long-term. See Visual B, Vegetative Sub-types and Visual C, Range Improvements.

Source of Impact: Vegetative Manipulation

32. CONVERSION OF VEGETATIVE SUB-TYPES

Vegetative manipulation to convert 2,525 acres of big sagebrush vegetative sub-type to a grass aspect would cause a localized, long-term, negative impact on the sagebrush removed. However, the conversion to grass would have a localized, long-term, beneficial impact on vegetative quality. The establishment of grass would decrease erosion and would create a better balance between soil stability and animal use. Runoff from sagebrush, as a percentage of total precipitation, is several times higher than runoff from arid grassland. Runoff from sagebrush is a major contributor to sediment production from downstream gully and arroyo trenching in the Rio Puerco ES Area (Dortignac, 1956).

33. ALTERATION OF THREATENED AND ENDANGERED PLANTS

Endangered or threatened plants could be impacted by changes in grazing use. See Chapter II, Vegetation, Endangered and Threatened Plants. Because there is a lack of data concerning the phenological requirements of these plants, impacts, whether beneficial or adverse, cannot be determined. Any alteration of threatened and endangered plants is an area-wide, long-term, adverse impact.

Wildlife

Because the diverse wildlife species would receive widely differing impacts from the proposed action, the discussion of anticipated impacts is broken down as follows: Aquatic Wildlife; Terrestrial Habitat (big game, birds, small mammals, arthropods). The four sources of impacts from the proposed action have been analyzed according to these classifications.

Aquatic Wildlife

Source of Impacts: Rest and Deferred Rotation Grazing Systems

34. INCREASED WATERFOWL USE

Habitat for waterfowl and shorebirds would be enhanced by the periodic exclusion of livestock from the existing 150 pit tanks and reservoirs through rotation of livestock use and the development of one pit tank. The natural vegetative productivity would be increased on approximately 27 acres of existing habitat and an additional quarter acre of new habitat would be provided.

Studies by Gjersing (1971) in Montana indicate that the additional vegetation occurring on pit tanks subjected to rotated livestock use and rest, as contrasted to unmanaged grazing of reservoir and pit tank areas, showed a 300 percent increase in use by migratory waterfowl. While conditions differ in reservoir and pit tank size, water holding capacity, and duration water is retained, it is assumed that the present estimated use of 200 to 250 ducks and shorebirds per pit tank would double after implementation of the proposed AMPs. (Quantification in this section refers to number of use periods rather than individual birds.)

The construction of one pit tank would provide habitat for use by 400 to 500 ducks and shorebirds annually.

This additional habitat, combined with the improved quality of existing reservoirs, would provide for an estimated total annual use increase of 30,000 migratory waterfowl and shorebirds. Reservoirs and pit tanks would be used as resting areas for mallards, pintails, widgeons and other surface feeding ducks during spring and fall migrations. Shoreline vegetation would provide areas of use for killdeers, plovers, stilts, sandpipers and other shorebirds.

Existing reservoirs, pit tanks and the proposed water improvements which would benefit waterfowl and shorebirds are scattered throughout the area. Therefore, increased use by these species would be distributed throughout the ES Area. The increase of one quarter surface acre of water, resulting from the construction of an additional pit tank in the North San Luis Mesa Allotment, would provide for waterfowl and shorebird use in an area presently deficient in such habitat. The overall increased use of reservoirs and pit tanks by waterfowl and shorebirds would be an area-wide, long-term, beneficial impact.

35. IMPROVED WATER QUALITY

Anticipated decreased sediment yield (see Table III-4) would improve water quality which in turn would improve aquatic habitat. This improved water quality would occur on three sites containing less than five acres of aquatic habitat. Any improvements in water quality would have localized, long-term, benefits for aquatic wildlife.

36. SALINE WATER

Increased groundwater withdrawals to support grazing management systems could cause the mixing of fresh and saline waters. (This could occur in only the Rincon Grande and Chiuilla surface storage tanks; all other reservoirs are fed by surface runoff.) If this occurs, the surface storage tanks would become more saline and their ability to hold dissolved oxygen would be reduced. This would result in declines of existing aquatic fauna unable to tolerate such conditions. Data is not sufficient at the present time to predict the probability or magnitude of such occurrences. The impact would be long-term once established.

Terrestrial Habitat

Big Game

Source of Impact: Rest and Deferred Rotation Grazing Systems

37. DECREASED COMPETITION

The concentration of livestock in use pastures within deer, elk and antelope range would result in short-term, localized increases in forage and habitat competition between livestock and the big game animals. However, there would be big game habitat improvement as forage increases (see Vegetation, Impact 22). Approximately 60 percent of the public lands would not be grazed by livestock at any given time. The removal of livestock from these pastures during periods of rest would eliminate competition between livestock and the big game animals using these pastures for the duration of the rest period. The overall effect would be a long-term, area-wide reduction in big game/livestock competition. Competition within use pastures would be greatest during the initial implementation of the grazing systems. As forage abundance and quality improves, this impact would be reduced.

Mule Deer, Elk

The most important ranges for deer and elk in the unit are the winter ranges of the Ignacio Chavez Grant area (approximately 11,500 acres) and the La Ventana area (approximately 6,200 acres). Key forage species in these areas include mountain mahogany and various grasses. Livestock grazing of these and other areas which support limited yearlong populations of deer, results in a substantial use of both grasses and shrubs by livestock in areas where big game concentrate during the winter or range through the year. The grazing of winter concentration areas would result in greatest competition for forage between elk, deer and livestock. Utilization of these areas would have the greatest impact on elk and deer due to limited size and big game concentration on these ranges.

Although there would still be competition between wildlife and livestock during livestock use periods, this competition would not be measurably greater than what currently exists on the Elk Springs, Los Pinos Arroyo and San Pablo allotments. The allocation of 234 AUMs of forage and yearlong rest of two pastures would help increase deer and elk numbers by 30 to 60 mule deer and 15 to 25 additional elk.

The Ignacio Chavez and El Banquito allotments (Mesa Chivato Area) encompass approximately 11,500 acres of deer and elk range. Winter ranges utilized by seasonal migrants normally include areas below the mesa rim, with an estimated 900 acres lying immediately below the rim, extending from Toruno Spring to Bear's Mouth. This is considered critical range due to the relatively high concentration of elk and deer which commonly winter in the area. The bi-yearly summer grazing of the mesa top, and the Ignacio Chavez and El Banquito allotments, would result in substantial use of forage by livestock in an area utilized in winter by approximately 60 to 80 elk, and 250 to 300 mule deer. In addition, there are approximately 50 deer and 20 elk which inhabit the allotments yearlong. The competition between wildlife and livestock, however, would not be measurably different from what currently exists.

Moreover, the Ignacio Chavez and El Banquito AMPs would have a positive effect on the critical and general habitat area through exclusion of livestock from the mesa top during rest periods up to 20 months. The estimated 20 to 25 percent forage production increase in cool season grasses and quality browse would provide the additional forage for a projected increase of 25 to 30 elk and 75 to 100 deer.

Antelope

The most important ranges for antelope in the unit lie within the proposed AMPs of Lost Valley, Cachulie, Dry Well, Arroyo Alamito, San Ysidro Pasture, and Arroyo Piedra Parada. These areas support an estimated 75 head of antelope which depend on habitat within the proposed allotments yearlong. The early spring grazing of one-third to one-fourth of the area of each allotment would result in competition between livestock and antelope for early green up grasses and forbs. This competition, while offset to some extent by a forage reservation equal to existing use, could result in a reduction per use pastures of available grasses and forbs.

The extent to which antelope may move to take advantage of ungrazed pastures depends upon normal behavior patterns, topography, and vegetative sub-types in the area. When antelope are a couple of weeks old, the bands may range over a wide area, but until then they are normally tied to a relatively small area due to the immobility of the young. Antelope/livestock competition would be moderate during the fawning period on one-third to one-fourth of the area during any given year. These would have the following impacts on antelope: reduced quality forage available to nursing does and kids following weaning, resulting in possible kid mortality; and, possible malnutrition and decline in health of nursing does. The degree of this impact would depend upon several factors such as nearness of waters with consequent concentration and utilization of forage, and the ability or willingness of antelope to move to adjacent ungrazed areas. The overall adverse impact is expected to be slight under the proposed action, as contrasted to present yearlong livestock utilization of the area.

The exclusion of grazing on the rested pastures of allotments and lack of grazing on two-thirds to three-fourths of each allotment before July, would be highly beneficial to antelope. It is expected that general antelope habitat in the area would improve by an estimated 25 percent with a corresponding increase in antelope numbers anticipated. The habitat improvement should have the following impacts: (1) increased carrying capacity and health of adult animals; and, (2) improved productivity of the herds. There would be an increase from 85 to 228 animals. Decreased competition would be an area-wide, long-term, beneficial impact on wildlife. (Increased wildlife numbers are based on BLM Wildlife Specialist projections.)

38. FORAGE RESERVATION

Of 3,313 AUMs reserved for wildlife use, 3,278 AUMs would be reserved on allotments with grazing systems. (An additional 35 AUMs would be reserved on ungrazed allotments, see Impact 48.)

Forage reservation on proposed rest and deferred rotation allotments most important to big game are listed below. Allotments in critical deer, elk habitat:

Allotments in critical deer, elk habitat:	
Los Pinos Arroyo	75 AUMs
Elk Springs	99 AUMs
San Pablo	60 AUMs
Ignacio Chavez	1,084 AUMs
El Banquito	111 AUMs
Total	1,429 AUMs

Allotments in critical antelope habitat:

Cachulie	150 AUMs
Lost Valley	150 AUMs
Dry Well	12 AUMs
Arroyo Alamito	12 AUMs
San Ysidro Pasture	12 AUMs
Arroyo Piedra Parada	24 AUMs
Total	360 AUMs

Forage habitat competition between wildlife and livestock would be further reduced through reservation of forage for wildlife. This reservation would ensure forage availability in excess of that licensed for livestock use.

Rest rotation grazing along with forage reservation would help increase mule deer by 30 to 60 animals on the Los Pinos Arroyo, Elk Springs and San Pablo allotments. Elk would increase by 15 to 25 animals. Big game on the Ignacio Chavez and El Banquito allotments would increase by 25 to 30 elk and 75 to 100 deer. Antelope would increase by from 85 to 228 animals overall. Forage reservation would be a beneficial, area-wide, long-term impact on big game. (Increased wildlife numbers are based on BLM Wildlife Specialist projections.)

39. INCREASED WILDFIRES

Estimated increases of 50 to 100 percent in vegetative litter (see Impact 23) would create a receptive environment for wildfires to start and spread. From 1967 to 1976, wildfires in the ES Area were confined to less than 85 total acres. While the number of wildfires may not increase above the current three fires per year, increased vegetative litter would increase the potential for fires to spread more rapidly and consume more acreage. The immediate effect would be localized reductions in big game habitat due to losses of available food and cover. Because of their mobility, this impact would be negligible, and big game would move into areas where habitat requirements are provided.

In the long-term, wildfires would be beneficial to big game. Forage growth, particularly among browse species, would be stimulated. Within the first growing season following the burn, the area would have a large variety of grasses, forbs and shrubs, relatively high in protein and other essential nutrients. Depending on the condition of the habitat prior to the burn, the carrying capacity of the area could conceivably be increased within a few years following the burn. Since such burns would be uncontrolled, however, the extent of habitat improvement could not be estimated. Because of big game mobility this impact would be negligible on big game populations.

40. SALINE WATER

Increased groundwater withdrawal for wildlife and livestock use could cause saline water intrusions into fresh water aquifers. If this mixing occurs, there would be a adverse impact on big game utilizing these waters. There is insufficient data available to predict the probability or magnitude of such an occurrence.

41. IMPROVED WATER QUALITY

Decreased sediment yield would improve quality of water utilized by wildlife. This would be an area-wide, long-term, beneficial impact. At the present time, information for quantification is not available.

Source of Impact: Construction and Physical Presence of Range Improvement Projects

42. FENCES

Fences would be detrimental to big game through creation of additional obstacles to free movement needed to utilize dispersed forage and seasonal migrations. Fences, even when constructed to minimize access problems for big game, constitute barriers until animals learn to negotiate them. The construction of 65.9 miles of new fence, along with 752 miles of existing fences used to implement the livestock grazing management program, would have a cumulative adverse affect on big game movements. A certain amount of death and injury would occur when big game animals become entangled in fences or are cut by barbed wire. Open wounds could readily become infected. Death losses resulting from the additional fences should not exceed one animal per year and would probably be less. This would be a localized, long-term, minor impact on big game populations.

43. WATER DEVELOPMENT

Development of dependable water in each pasture of every allotment would increase the amount of available water, or, in some instances, provide water where none previously existed, for an expected overall benefit to big game habitat quality. In addition to waters developed for livestock use, an additional 73 water sources would be constructed specifically for wildlife use.

The additional waters to be developed in the Eagle Mesa, Dry Well, Canada Candaleria, Cachulie, San Ysidro and Pipeline AMPs, encompassing habitat of existing antelope populations, would amply fulfill antelope water requirements of one quart to one gallon per animal per day yearlong. The provision of dependable yearlong waters three to four miles apart, in conjunction with available forage, would double suitable antelope habitat and populations.

The additional waters which would be developed in the allotments encompassing the primary deer and elk winter ranges of Continental Divide, La Ventana Mesa and Mesa Chivato would assure dependable waters to meet daily requirements of 1 to 1.5 gallons for deer and 8 to 12 gallons for elk. The amount, availability and quality of water can increase wildlife numbers or expand the use of the habitat (Yoakum and Dasmann, 1969). In addition, the productivity and nutritive value of food plants influence the carrying capacity of the range (DeVos and Mosby, 1969). Provision of dependable waters in conjunction with the anticipated forage improvement resulting from rest and deferred rotation grazing would, therefore, be expected to expand carrying capacity of big game ranges by an estimated 50 percent, with corresponding increases in population to be expected. Increased available water would be a localized, long-term, beneficial impact on big game.

44. ATTRACTION OF PREDATORS

Additional water developments for livestock and wildlife use would tend to concentrate big game in the vicinity (see Visual C for proposed water developments). This increased concentration would attract predators and may alter predator-prey relationships. This adverse impact cannot be quantified with existing data, but is expected to be a localized, long-term impact.

Source of Impacts: Vegetative Manipulation

45. HABITAT CONVERSION

Conversion of approximately 2,525 acres of big sagebrush to herbaceous plants, primarily grasses, would be beneficial and adverse to big game species. The 1,465 acres of proposed burning in the Cebo allotment encompasses an area of historic antelope range where antelope were extirpated in the early 1900's as a result of over-hunting and deteriorated range conditions. The prescribed burning, in conjunction with intensive grazing management and periodic rest from grazing for one year periods could create the interspersion of grasses, forbs, and browse vegetative types required for quality antelope habitat. Either as a result of ingress from northern allotments presently supporting antelope or as a reintroduction by New Mexico Game and Fish Department, the Cebo allotment could support a herd of five to fifteen head when a vegetative conversion occurs.

The proposed burning of 320 acres within the Elk Springs and Coal Creek allotments would affect habitat utilized by winter concentrations of elk and deer. The proposed burn would reduce present cover and alter the present vegetative complex in favor of grass. In the short term, wintering elk would be provided increased grass forage, because livestock would be excluded from treatment areas for two years following the burn. In the long term, however, competition between elk and livestock during fall and winter would increase. It is estimated that the proposed treatment would improve range conditions in the treatment area, allowing for an increase (by the year 2000) of 50 AUMs annually.

The impact on wintering mule deer would be an immediate reduction in available cover. The key browse plants of mountain mahogany and fourwing saltbush would be expected to resprout following burning, providing the new growth selected by deer, elk and livestock. While a short-term increase in elk could be expected, the long-term reduction in deer use and general habitat quality for big game would result in a reduction of elk and deer use.

The proposed brushcutting of 480 acres of big sagebrush within the Twin Butte and Canada Candelaria allotments and the burning of 260 acres in the Chiuilla allotment would represent a negligible impact on mule deer, the only big game animal utilizing the area. The areas involved are small and have a very low density of deer. The overall effect of habitat conversion is considered a localized, long-term, beneficial impact.

Source of Impact: Ungrazed Allotments

46. FORAGE RESERVATION

The reservation of all forage on the 520 acres of public lands within the San Miguel, Rock Ridge, Bama and Molino allotments would reduce competition and assure the availability of 35 AUMs of forage for deer, elk, rabbits and small rodents. Exchange of use agreements would ensure that all forage is reserved for wildlife. This procedure would ensure the availability of the reserved forage, and provide for wildlife use on adjoining private lands to balance the incidental livestock use of the public lands. Bama allotment would be fenced to ensure no livestock use.

The short and long term impact to be expected is positive, as a result of an increase in wildlife forage which had previously been utilized by livestock. The additional forage is expected to increase mule deer use from approximately seventeen to twenty-five head and elk from approximately two to five head.

Birds

Source of Impacts: Rest and Deferred Rotation Grazing Systems

47. IMPROVED HABITAT

The implementation of rest and deferred rotation systems would be a beneficial impact on scaled quail, ground nesting mourning doves, nighthawks, horned larks and meadowlarks in grasslands; nighthawks and poor-wills in pinyon-juniper woodlands; and turkeys in ponderosa pine vegetation. This beneficial impact would result from exclusion of over 70 percent of the total area from grazing during the summer nesting period. Approximately 290,000 acres would be free of livestock for any given summer period to avoid conflicts during this critical nesting season. Turkeys select a nesting site near the strutting grounds and close to water (Schorger, 1966). There is fairly dependable evidence that the breeders return to the same nesting grounds as long as they are in the prime of life and the area is not seriously disturbed (Ligon, 1946). The periodic exclusion of livestock from rested pastures would, therefore, be most beneficial to turkeys during the rest periods of established nesting grounds. The other ground nesting birds of the area are more opportunistic in their nesting habits and could be expected to benefit from all pastures providing habitat needs within their range. Habitat improvement would be a long-term, area-wide, beneficial impact for birds.

48. HABITAT DESTRUCTION

The concentration of livestock in use pastures would cause localized, short-term increases in nest trampling and abandonment. There would also be a localized, short-term increased loss to predators through heightened visibility. Species most directly affected would be scaled quail, ground nesting mourning doves, nighthawks, horned larks and meadowlarks in grasslands; nighthawks and poor-wills in pinyon-juniper woodlands; and turkeys in ponderosa pine vegetation. Some birds would attempt to renest if their eggs or nest were destroyed. This impact would result from heavy use of vegetation and livestock concentration at water sources. As forage abundance and quality improve, this adverse impact would be reduced. Habitat destruction would be a long-term, area-wide impact, but is considered negligible.

49. INCREASED WILDFIRES

A 50 to 100 percent increase in vegetative litter (see Impact 23) would cause a receptive environment for wildfires to start and spread. Wildfires may not increase above the current three fires per year, but increased vegetative litter would cause these fires to spread more rapidly and consume more acreage. Wildfires would cause localized destruction of bird habitat. In the southern portion of the ES Area (allotments 26 through 49) wildfires would result in some quail mortality. However, because of the mobility and reproductive potential of most bird species, usually the impact on populations would be negligible. Wildfires would cause localized, long-term impacts.

50. SALINE WATER

Increased groundwater withdrawals for wildlife and livestock use could cause saltwater intrusions into fresh water aquifers. If this mixing of fresh and salt water occurs, there would be an adverse, localized, long-term impact on birds utilizing the water. There is insufficient data available to predict the probability or magnitude of such an occurrence.

51. IMPROVED WATER QUALITY

Decreased sediment yield would improve quality of water utilized by birds. This would be an area-wide, long-term, beneficial impact. At the present time, information for quantification is not available.

52. WATER DEVELOPMENT

The development of 247 new water sources would improve habitat for birds (see Table II-14 for major bird species, Visual B for vegetative sub-types, and Visual C for water developments). The additional water would alleviate current limitations in habitat and population increase. This beneficial impact would have area-wide, long-term, beneficial effects on all bird species, and would be particularly beneficial to doves, turkeys and quail.

53. ATTRACTION OF PREDATORS

An adverse, localized, long-term impact could result from the attraction of predatory mammals and snakes to an extent that ground nesting birds would not be able to reproduce in the immediate area of new water developments (see Visual C). Overall this impact would be negligible.

54. ATTRACTION OF INSECTS

There may be an area-wide, long-term increase in insects attracted by the water, livestock and manure, creation of dusting areas, and in the case of the ponds, creation of new habitat in the form of water, mudflats, and riparian vegetation.

55. HABITAT CONVERSION

Sagebrush burning and brushcutting would have an adverse, short-term impact on brushland bird species. The vegetative manipulation would displace the twelve bird species restricted primarily to the big sagebrush sub-type and the twelve to fifteen species which frequent the vegetative sub-type. These would be replaced by seven species found in open grass types. (See Supplementary Reference II-4 on file in the Albuquerque District Office.) A complete displacement would not be expected due to islands of unburned sage, and erratic boundaries typical of controlled burns.

However, removal of big sagebrush from the burned areas would also have a detrimental effect upon the diversity of bird species dependent upon the middle and lower vegetation strata of the sagebrush sub-type. Bird species such as the Brewers' sparrow and Vesper sparrow are virtually eliminated by total sagebrush eradication. In addition to displacement of the habitat selective sparrows, many birds would be affected through loss of required perching or nesting sites provided by sagebrush vegetation (Daubenmire and Daubenmire, 1968). Removal or modification of the vegetative strata associated with sagebrush reduces the diversity of bird species found in the burned area for several years (until foliage pattern and density once again meet requirements).

However, small irregular areas of sagebrush conversion, as is expected on the 2,525 acres, would increase the edge effect and thereby the diversity of bird species for the ecotone area (Bell and Studinski, 1972).

The short term effect, assumed to be no longer than one growing season, would be the reduction of brushland species due to limited available habitat. The long term effect of burning would be a greater overall number and increased diversity of grass and brushland species, utilizing a more diverse habitat. The net impact to be anticipated would be the presence of 25 to 30 bird species utilizing a habitat previously inhabited by 12 to 15 species. Overall, this impact would be localized and long-term.

56. INCREASED SEED PRODUCTION

The proposed grazing systems would provide a period of rest for seed production. This would increase the availability of food for all seed eating birds, and would be particularly beneficial to doves and quail. Quail would increase densities in areas where food is the most critical limiting factor. Increase in the total number of doves using the area may not be measurable, but the intensity of use by existing dove populations would increase, relative to the increase in seed production. The increased food availability would be a long-term, area-wide impact.

Wild Turkeys

Source of Impacts: All Sources

57. IMPROVED HABITAT

The proposed grazing systems for the Ignacio Chavez allotment, encompassing the only wild turkey habitat within the area, would have a beneficial impact on turkeys. Periodic rest from livestock grazing on individual pastures would improve overall turkey habitat.

The increased seed production and cover of rested areas, moderate utilization of grazed pastures, and additonal water development would enhance limiting habitat factors of the area. The present population is approximately 75 and it is estimated that this would double. The reduction of cover and availability of seeds in areas of summer grazing would probably shift turkey use to areas excluded from livestock use. Intensive grazing management and an additional water development would be a beneficial, localized, long-term impact on wild turkeys.

Raptor/Prey Relationship

Source of Impacts: All Sources

58. IMPROVED RAPTOR HABITAT

Livestock grazing would be both beneficial and detrimental to raptor populations. Under some circumstances, concentration of livestock grazing in use pastures could make grass more suitable for certain small mammals (Stoddart and Smith, 1943). Not only are populations of prey mammals high in these situations, but vulnerability to predation is also presumably high because of reduced cover. In the case of the burrowing owl, low growing vegetation is beneficial and holes created by burrowing mammals such as prairie dogs are necessary.

However, studies of the Rio Puerco ES Area indicate that small mammals are generally most abundant in ungrazed or moderately grazed habitat (University of New Mexico, 1975). Thus it would appear that through increased prey abundance raptors would benefit indirectly from the proposed systems of moderate grazing.

Proposed range improvement projects would benefit raptors inhabiting the area. Studies of Cooper's hawks in New Mexico indicate that nests of these species are rarely found more than a quarter mile from water, whether this is a stock tank, reservoir, stream or seep. (Smith, 1975). In many cases, nests of Cooper's hawks and other raptors are placed in close proximity to such sources of water. It appears that the presence of water is a key component in nest selection for these species.

Fences or other elevated structures would improve conditions by providing hunting perches. Improvement in raptor habitat would be an area-wide, long-term, beneficial impact.

Source of Impacts: Construction and Physical Presence of Range Improvement Projects

59. PERCHES

Fences and windmills would provide perches for raptors, flycatchers and shrikes and safer resting areas for other birds. This would be a localized, long-term, beneficial impact.

Small Mammals

Source of Impact: Rest and Deferred Rotation Grazing Systems

60. IMPROVED HABITAT

Periodic rest from livestock grazing on individual pastures would cause an overall improvement in small mammal habitat. This improvement would result from increased total ground cover and seasonal rest for forage production. Improved habitat would be an area-wide, long-term, beneficial impact on small mammals.

Livestock grazing would alter vegetative structure resulting in reduced food and cover in use areas. A mosaic of small mammal populations of differing densities and species composition would be created. Studies conducted by the U.S. Fish and Wildlife Service Laboratory indicate two primary factors accounting for small mammal species diversity and density within vegetative types: foliage height diversity (cover as provided by forage of herb, shrub and canopy layers) and horizontal diversity within a foliage level. The trampling of rodent dens and reduction of cover and food availability during and following grazing periods would reduce small mammal populations in use pastures by an estimated 25 percent in grass types and ten percent in shrub-forest areas.

61. HABITAT REDUCTION

There would be a reduction of small mammal habitat quality during grazing periods. Since studies (University of New Mexico, 1975) of the Rio Puerco ES Area indicate that small mammals are most abundant in ungrazed or moderately grazed habitat, it is assumed that the moderate grazing intensity proposed would increase small mammal abundance and species diversity.

The reduced vegetative cover in use pastures would improve predator success for the benefit of mammalian predators dependent upon small rodents as a food source. This would be a localized, long-term, adverse impact. As forage quality and abundance increase, this impact would be reduced.

62. INCREASED WILDFIRES

Increases in wildfires would have an adverse, localized, long-term impact on small mammals through habitat destruction. Over the previous nine years, wildfires have been confined to less than 85 total acres. While the number of wildfires may not increase above the current three fires per year, increased vegetative litter would increase the potential for fires to spread more rapidly and consume more acreage.

The reduction of cover and food sources would reduce abundance and diversity of small mammals in the burned area. This would be offset to some extent by the adjacent areas of unburned vegetation and the irregular spotty anticipated burn pattern. The overall impact would be adverse in the short-term until burned areas revegetate.

63. SALINE WATER

Increased groundwater withdrawal for wildlife and livestock use could cause saline water intrusions into fresh water aquifers. If this mixing of fresh and saline water occurs, there would be an adverse, long-term, localized impact on small mammals utilizing the water. There is insufficient data available to predict the probability of such an occurrence.

64. IMPROVED WATER QUALITY

Decreased sediment yield would improve quality of water utilized by small mammals. This area-wide, long-term, beneficial impact is difficult to quantify with existing data.

Source of Impact: Construction and Physical Presence of Range Improvement Projects

65. HABITAT DESTRUCTION

Proposed range improvement projects would disturb small mammal habitat (see Visual C). The short-term disturbance of 65.9 acres for fence construction, along with disturbance (approximately eleven acres) immediately adjacent to the fence where cattle would trail, would have limited effect on small mammal habitat. There would be a disturbance of 13.18 acres long-term.

The development of the proposed tanks, troughs, pipelines and related facilities would adversely impact small mammal habitat. There would be short-term loss of vegetation on a total of 357 acres during construction and long-term disturbance of an estimated 51 acres. The most detrimental effect would occur on the estimated 120 acres of habitat adjacent to water, which would be subjected to grazing use in an average year. Small mammal habitat is most affected through use of these areas, with consequent destruction of ground cover and vegetation. Habitat destruction would be a localized, long-term, adverse impact but cumulatively it would be negligible.

66. ATTRACTION OF PREDATORS

A further impact could result from the attraction of predatory mammals and snakes around water developments (see Visual C). Populations of small mammals would be reduced in the immediate areas of fences and water developments as a result of increased prey visibility. The attraction of predators would be a localized, long-term impact on small mammals. The cumulative impact would be negligible.

67. WATER DEVELOPMENT

The development of 247 water sources (listed on Table I-7 and displayed on Visual C) would improve habitat for small mammals. This beneficial impact would be area-wide and long-term.

Source of Impact: Vegetative Manipulation

68. HABITAT CONVERSION

Habitat conversion through sagebrush burning would reduce abundance and diversity of small mammals in the burned area. The loss of small mammals in the burned area would be offset to some extent by the adjacent areas of unburned vegetation and the irregular spotty anticipated burn pattern. The overall impact would be localized and adverse in the short-term until burned areas revegetate, then beneficial in the long-term through habitat diversity (conversion of some big sagebrush to grass).

Arthropods

Source of Impacts: Rest and Deferred Rotation Grazing Systems

69. INCREASED DIVERSITY

Vegetation plays an important role in both distribution and numbers of arthropods beyond that of providing a source of food. Vegetation height, density and composition all affect arthropod density. A number of studies have recognized the detriment or benefit to various arthropod species related to livestock grazing of differing intensities. Pepper (1955) reported that almost without exception, high population densities of grasshoppers occur in areas with excessive livestock grazing, or with a combination of heavy grazing and dry weather. Overgrazing causes many insect species to decline or disappear, but it can enable grasshoppers to increase enormously.

Studies on the International Biological Program Grassland Biome (1971) revealed consistently greater number of arthropods throughout the season in the permanently ungrazed plots. These data are consistent with those of Morris (1967) who found that most taxonomic groups he sampled were most common in areas left ungrazed for two to three years. Lightly grazed plots supported greater numbers of arthropods than did moderately or heavily grazed plots; light grazing of pastures resulted in a build-up of *Homoptera* (plant sucking insects) which was maintained throughout the season; and ants were found in smallest numbers in the heavily grazed pasture (Lavigne, et al, 1972).

The proposed grazing management systems should control such injurious rangeland insects as grasshoppers and mormon crickets (Smith, 1940). The stocking adjustments and moderate grazing design for increased vegetative production and diversity would reduce insect damage to desired forage.

The increase in vegetative ground cover and plant vigor to be expected would not eliminate destructive species, but would provide a habitat more favorable to a balance of arthropods and the larger herbivores dependent upon the forage resource. Increased arthropod species diversity would strengthen the food chain component for small mammals and birds which depend on this high protein food source. Increased diversity of arthropods would be an area-wide, long-term, beneficial impact.

Source of Impact: Vegetative Manipulation

70. HABITAT CONVERSION

Habitat conversion through sagebrush burning would effectively eliminate arthropods from the burned area either as a result of the initial fire or through subsequent loss of food and cover. The displacement would be of short-term duration, with a wide variety of insects immigrating from adjacent unburned areas to capitalize on the emergent regrowth or new plant establishment. The reestablishment of a variety and diversity of arthropods able to utilize the modified habitat would expedite the establishment of birds and small mammals which depend upon arthropods as a food source. The cumulative impact would be localized and short-term.

Cultural Resources

A discussion of factors affecting the condition of known cultural resources on public lands in the ES Area is discussed in Chapter II. In summary, the sample survey shows that 85.5 percent of the cultural properties are in poor physical condition with the major impacts resulting from erosion. Recent use of the area including grazing, has also resulted in adverse impacts. The following discussion describes the potential impacts on cultural resources which could result from the proposed action. Procedures intended to protect cultural resources from impacts due to the construction of grazing facilities such as pipelines, fences, wells, and storage tanks are included in the proposal; however, impacts on cultural sites would be assessed at the time these projects are designed in future Environmental Assessment Records. Mitigating measures, such as avoidance of cultural sites, to eliminate or reduce impacts would also be made at that time. This procedure has been developed in consultation with the New Mexico State Historic Preservation Officer. Before this approach was agreed upon, the areas of intensive survey which contained proposed facilities were inspected to determine if there were a potential for significant impacts due to construction. The results of this review are shown in Table III-12. In the majority of cases no impacts were evident, and it appears that no loss of cultural values would result from the construction of facilities if the design restraints and review procedures previously described are employed. Adjustments of preliminary designs would be required in some cases as discussed in Impact 74. Impacts 71 through 73 consider those aspects of the proposed action not covered by the design restraints identified in Chapter I.

Source of Impacts: Rest and Deferred Rotation Grazing Systems

71. INCREASED WILDFIRES

Increased litter resulting from the rest and deferred rotation grazing systems would create a receptive environment for wildfires to start and spread. These wildfires may not increase above the current three fires per year, but increased vegetative litter would cause these fires to spread more rapidly and consume more acreage.

Table III-12

POTENTIAL IMPACTS OF RANGE IMPROVEMENTS ON CULTURAL RESOURCES

Range Improvements	Total Units Proposed	Total Acres of Impact	Total Units Surveyed	Number of Known Sites Impacted	Percent of Range Improvement Sites Surveyed
Wells	11	5.5	1	0*	9%
Spring Development	7	1.4	4	0*	57%
Catchment	4	4.0	0	-**	0
Pit Tank	1	3.8	0	-**	0
Pipeline	166.7 mi.	250.05	31.45 mi.	15***	19%
Troughs	139	14.1	16	0*	11%
Storage Tanks	13	2.6	0	-**	0
Stock Trail	.5 mi.	1.2	0	-**	0
Roads	22.4 mi.	134.4	0	-**	0
Vegetative Manipulation	2,525 ac.	2,525	320	3	12%
Fences	65.9	65.9	5.5 mi.	0*	9%
Cattle Guards	55	55	7	0*	13%

*No sites were found in the portion of the area inspected.

**None of the area has been inspected.

***If the proposed pipeline can be placed in an area of existing surface disturbance in the Banco de la Casa and Guadalupe Community Allotments, impacts on these sites and others can be avoided.

Source: Eastern New Mexico University
Stratified Class II Survey
Rio Puerco ES Area, 1976
Albuquerque District Files

Fire has the effect on cultural resources of consuming combustible items (wood and fiber). Stone and ceramic artifacts can also be adversely altered by heat. Heating can introduce color, texture, and thermal radiation changes to these materials which destroy their utility for studies of prehistoric technologies and thermoluminescent dating. Fires also mask the evidence for prehistoric hearths and provide a source of charcoal contamination of C14 dating samples from hearths. These effects would reduce the available data for scientific study or make data sources unreliable through alteration and contamination. Once introduced, these effects are permanent. The overall impact would be short-term during each fire, but the propensity for larger wildfires would be long-term.

72. Disturbance by Livestock

Grazing management systems would increase livestock density within use pastures increasing the chance of cultural site disturbance. Trampling would affect cultural items directly through destruction as well as indirectly through modification, chipping and fracturing, which destroys the utility of artifacts for the study of prehistoric technologies. This impact would be most evident with lithic artifacts and less significant, though present, with ceramics. Livestock trampling also has the effect of disturbing the spatial relationships of cultural items used to reconstruct the activities which took place at a site. Both vertical and horizontal displacement can occur, particularly in an area with as little vegetative cover as the ES Area. Although the area is expected to show increased vegetative cover as a result of the proposed action, this would do little to lessen the impacts of livestock concentrations when grazing systems are implemented.

Under the proposed action, this effect would be active on all public lands, except the 520 acres not authorized for grazing. Such destruction and displacement of materials is expected to be greatest at sites adjacent to livestock waters (and other facilities where livestock concentrate). Properties at Azabache Station, Guadalupe Pueblo Complex, and the San Luis Archaic Site could be damaged by livestock rubbing and trampling. The impacts would be cumulative, as cultural resources lack the recovery potential of biological resources. The adverse impact on scientific values would be long-term.

73. Less Soil Erosion

Currently, cultural resource values are undergoing deterioration through soil erosion. The long-term effect of the proposed action is expected to be beneficial in decreasing soil erosion by the year 2000. There is no direct measure to estimate the exact relationship between the expected improvement in soil stability and the effects on the current rate of cultural resource deterioration. The magnitude of the reduction of sediment loss averages 25 percent, and the rate of deterioration may be reduced by an equal measure by the year 2000. As the majority of these sites are estimated to be in poor condition (see Table II-26), and would be impacted by trampling at a greater rate than at present, a 25 percent reduction in erosion by the year 2000 may show no net benefit to the cultural resources.

Source of Impacts: Construction and Physical Presence of Range Improvement Projects

74. Disturbance by Project Construction

Cultural resource values are most directly threatened by disturbance from range improvement construction. For this reason, the Bureau of Land Management includes as part of construction activities, procedures to avoid inadvertent adverse impacts on cultural resources. These procedures are described in Chapter I.

As noted above, the impacts of specific range facilities would be analyzed when the individual projects are designed. At present, impacts from this source are known to exist where pipelines and troughs are proposed in the Banco de la Casa and Guadalupe Community allotments. (See Table III-12.) These areas contain large numbers of cultural sites, and the existing preliminary design of pipelines intersects site locations. If this design is followed, cultural materials would be destroyed and displaced. Mitigation through excavation prior to construction would reduce, but not eliminate, the impact on scientific values. This localized, adverse impact would be long-term.

Source of Impact: Vegetative Manipulation

75. Disturbance by Vegetative Manipulation

The proposed action includes vegetative manipulation on 2,525 acres. The effects of rotary brush cutting would be similar to that described for trampling, while the effects of burning would be the same as those described for wildfires. At present, three cultural properties are known to be within the area proposed for manipulation. Based on the sample survey (see Table III-12), an area of this size may have eleven cultural sites. Sufficient opportunity is available for redesign to allow avoidance of this number of sites and still manipulate 2,525 acres. No adverse impacts on cultural resources are expected to occur when the avoidance aspect of the proposed action is implemented.

Paleontology

Source of Impact: Construction and Physical Presence of Range Improvement Projects.

76. DISTURBANCE OF MORRISON FORMATION

The Morrison Formation occupies about 23,056 surface acres (5.9 percent) of the total ES Area. The total disturbed area from proposed projects in all of the allotments with Morrison surface is 19.8 acres (pipeline, 13.5 acres; wildlife waters, .5 acres; fences, 4.5 acres; springs, .1 acres; troughs, .2 acres; windmills, .5 acres; wells, .5 acres). In general, the paleontological resources of the ES Area would not be significantly impacted by implementation of the proposed action; however, there would probably be some unavoidable destruction of paleontological sites. The discovery of new fossil bone deposits in the area would contribute valuable paleontological knowledge to the scientific community. See Map II-1 for location of Morrison formation in the ES Area. The probability of disturbing bone deposits cannot be predicted with present data. Possible destruction of paleontological resources would be a localized, long-term, adverse impact.

Visual Resources

The Visual Resource Management system was utilized in determining anticipated impacts of the proposed action. Table II-31 in Existing Environment shows the characteristics of the five Visual Resource Management (VRM) classes. The severity of the impact on the visual resources from any action would depend on the class in which the action occurs. There are four of the five possible VRM classes in the Rio Puerco ES Area: I, II, III, and IV. The objectives of these VRM classes in terms of modification are as follows:

Class I, no modification to the basic elements;
Class II, modification of the basic elements should not be evident;
Class III, modification of the basic elements may be evident but should remain subordinate; and
Class IV, modifications may subordinate the original landscape character but must reflect what could be a natural occurrence.

In rating the anticipated impacts of the proposed action, seven actions were identified as potentially not meeting the objectives of VRM Class II (see Table III-13). All except vegetative manipulation would meet the VRM objectives of Class III and IV areas. However, short-term vegetative manipulation would not meet even Class IV objectives. A complete discussion of classes and listing of ratings is included in Appendix III-4.

Source of Impacts: Rest and Deferred Rotation Grazing Systems

77. INCREASED WILDFIRES

Increased vegetative production resulting from the rest and deferred rotation grazing systems would cause a long-term increase in litter in the ES Area and would thereby create a receptive environment for wildfire to start and spread. The threat of fire varies between each vegetative sub-type. Grasslands would burn and spread faster than woodland types, although woodlands would produce darker smoke because of the heavier fuels. In the past, most fires have occurred in the pinyon-juniper sub-type. Smoke from such wildfires would be a localized, adverse impact on visual resources for the duration of the fire. Increased wildfires would also result in increased landscape contrasts between the burned area and the surrounding area. Contrast would be an adverse impact evident in the basic landscape elements of form, line, color, and texture, resulting from such things as openings in the natural vegetation, irregular perimeters around burns, charred vegetation and exposed soil color.

The short-term contrast ratings would not meet the objectives of Class IV. However, the visual impacts would lessen over time as revegetation occurs and class objectives for the area would eventually be met. Fire in the shortgrass sub-type would meet class objectives within one growing season. Other vegetative sub-types would take from 5 to 50 years to meet class objectives. The cumulative, localized, adverse impact would be long-term.

78. CONTRAST

The concentration of livestock in use pastures would cause short-term decreases in quality of

Table III-13

CONTRAST RATINGS FOR ACTIONS WHICH WOULD NOT MEET VRM CLASS OBJECTIVES

Action	Feature Causing Impact	Score*
1. Increased wildfires (from increased litter)	Exact ratings cannot be made for increased wildfires because location and extent of wildfires is unknown.	
2. Pasture development	vegetation (short-term)	20
	vegetation (long-term)	14
3. Fenceline construction	vegetation	13
	structures	13
4. Spring development	vegetation	12
5. Water catchments	land surface	12
	vegetation	13
6. Storage tanks, trough, & well sites	structures	16
7. Vegetative manipulation	land surface (short-term)	19
	land surface (long-term)	16
	vegetation (short-term)	27**
	vegetation (long-term)	20

---

* Class II - score should not exceed 10.
** This action will not meet any class objective.

Source: Summarized from Appendix III-4

Visual Resources throughout the ES Area. A contrast would develop between grazed and rested pastures. Basic landscape elements of form, line, color and texture would be altered and would reflect an adverse visual impact. The vegetative pattern contrast between pastures would result from initial heavy use of vegetation and livestock concentration at water sources. As forage abundance and quality improve long-term, this adverse impact would be improved and would be acceptable to VRM Class II objectives.

Source of Impacts: Construction and Physical Presence of Range Improvements

79. FENCELINE CONSTRUCTION

Of the 65.9 miles of fence proposed, 3.7 miles would not be acceptable to Class II. There are 0.9 miles in the Ignacio Chavez Grant allotment, 0.5 miles in the Mesa Cortada allotment, 1.1 mile in the Bama allotment and 1.2 miles in the Los Pinos Arroyo allotment. The visual contrast which would result from fence construction would affect the basic elements of form, line and color. When fences are built in a straight line, the line created may alter visual aspects of the vegetative subtype. Proposed fences would be constructed to minimize visibility and would not greatly impact the visual aspect. The Ignacio Chavez Grant allotment is partially to heavily forested and although the identified fence contrast exceeds the Class II limit, the proposed fences should be acceptable. Fences would be a long-term impact in the area.

80. SPRING DEVELOPMENT

Two of the seven spring developments located on the Chico Crossing and Dry Well allotments would not meet the objectives of VRM Class II. Spring developments would normally be very localized and visual impacts would be greater initially because of surface disturbance. The impact would decrease as heavy vegetative growth around the springs became established. Spring development would be a localized, long-term, adverse impact.

81. WATER CATCHMENTS

The four proposed water catchments located on the Coal Creek, Elk Springs, Ignacio Chavez Grant and San Pablo allotments would not meet Class II objectives. The natural landscape form would be altered by excavation of the basin, the embankment construction, and the opening created in the natural vegetative pattern. The color and texture would be modified by the contrast of exposed soil, collection apron and storage tank added to the landscape. The additional water, however, would add to the variety of the landscape. The construction of water catchments would be a localized, long-term, adverse impact.

82. STORAGE TANKS, TROUGHS, WELL SITES

Ten percent of the storage tanks, troughs and well sites would not meet Class II objectives. These developments would normally be very localized and visual impacts would be greater initially because of surface disturbance. Sky-lighted structures and structures requiring major cut and fill operations to prepare the site have the highest visual contrast. Since the storage tanks would be buried, the resulting visual contrasts would be low. Although these projects would be localized, they should be considered in conjunction with existing water facilities which would increase these cumulative visual impacts. There would be a localized, long-term, adverse impact on Visual Resources.

Source of Impact: Vegetative Manipulation

83. CONTRAST VEGETATIVE MANIPULATION

Vegetative manipulation on six allotments (2,525 acres) of big sagebrush would cause localized, short-term impacts on the basic landscape elements of form, line, color, and texture. (Refer to Table III-3 for allotments which would have vegetative manipulation.) Contrasts would result from such things as openings in the natural vegetation, irregular perimeters around burns, charred vegetation and exposed soil color.

The short-term contrast rating does not meet the objectives of any of the four classes. The visual impacts of vegetative manipulation would lessen over time as grasses, forbs and shrubs become established. In the long term, the treated areas would meet only Class IV objectives. Where vegetative treatments occur in heavy sagebrush stands, the contrast between sagebrush and grass/forb stands would remain fairly evident for a long period, perhaps up to 20 years. The cumulative, localized, adverse impact would be long-term.

Recreation

Utilization of rest and deferred rotation grazing systems would have varied impacts on the recreation resources within the Rio Puerco ES Area.

The proposal would generally provide a more diversified and balanced community of grasses, forbs and shrubs. This would enhance overall scenic quality. Anticipated area-wide impacts on recreation are discussed first in this section. This is followed by discussions of anticipated impacts on specific recreation areas.

Source of Impact: Rest and Deferred Rotation Grazing Systems

84. LESS WILDLIFE/LIVESTOCK COMPETITION

The proposed action would decrease forage competition between livestock and big game, as well as improve the overall conditions for wildlife. This would have a long-term, beneficial effect on hunting opportunity due to the anticipated increase in wildlife numbers. By the year 2000, hunter days are expected to increase by 19,000 (see Table III-14).

85. INCREASED WILDFIRES

Anticipated vegetative response to rest and deferred rotation grazing systems would cause an area-wide, long-term increase in vegetative litter and would thereby create a receptive environment for wildfires to start and spread. Wildfires may not increase above the current three fires per year, but increased vegetative litter would cause the fires to spread more rapidly and consume more acreage. Smoke would cause a localized, adverse impact on sightseeing. This impact would be short-term following each fire, but the propensity for larger wildfires would be long-term.

Source of Impacts: Construction and Physical Presence of Range Improvement Projects.

86. WATER DEVELOPMENTS

The proposed water developments would also increase the potential recreation value of the area. Reservoirs, catchments, wells and spring developments would positively affect the use of the recreational resources (ORV use, hiking, hunting and sightseeing). With increased recreational use, vandalism and littering may occur more frequently. This would be a long-term, adverse impact. However, water would be provided for wildlife use and would diversify scenic viewing. Disturbance for pipeline construction would have a short-term, adverse impact on the scenic quality of the area. The installation of pipeline by the trenching method would have more adverse impacts on sightseeing value than use of the ripping method. The cumulative, long-term impact of water developments would be beneficial.

87. FENCES

The proposed increase in fences (65.9 miles) would adversely affect the off-road vehicle recreators utilizing the area. Although there would be an overall increase of ORV use of the area with the proposed action, this increased use would be restricted on the Arroyo Piedra Parada and Gypsum Hill allotments. Proposed fence developments in these allotments would result in a loss of visitor-use days by the year 2000 (see Table III-14). Construction and maintenance of fencelines would have an adverse impact on scenic quality through horizontal contrast lines in the natural environment. Impacts from fences would be localized and long-term.

Source of Impact: Vegetative Manipulation

88. SMOKE-CONTRAST

Smoke from controlled sagebrush burning on four allotments (2,045 acres) would result in a short-term, adverse impact on sightseeing. Scenic quality would also be affected long-term by the contrast between burned areas and surrounding sagebrush stands.

Impacts on Specific Recreation Sites

89. LAND ALTERATIONS (IGNACIO CHAVEZ GRANT)

The Ignacio Chavez Grant is a part of three separate Allotment Management Plans (AMPs): El Banquito, Ignacio Chavez and Mesa Cortada. No measurable impacts on the recreation resources would take place with the implementation of the Mesa Cortada AMP in the northwest corner of the Ignacio Chavez Grant. Implementation of the Ignacio Chavez and El Banquito AMPs would create impacts on the recreation resources in the Mesa Chivato portion of the grant.

Proposed fence development in the Ignacio Chavez allotment would detract from the scenic quality. Hikers and hunters would experience some inconvenience as a result of the proposed fencing. Proposed water developments on the Grant would be beneficial for recreation by providing wildlife water. Increased ground cover and additional water resources would result in increased wildlife numbers and an increase in hunting potential. This would ultimately provide sta-

Table III-14

ANTICIPATED RECREATION DEMAND
Year 2000

Activities	Present Visitor Use Days	Estimated Visitor Use Days With Proposed Action	Demand Projections Without Proposed Action
ORV Use	170,000	182,000	191,000
Sightseeing Use	324,000	454,000	433,000
Primitive/Natural Area Uses	4,000	8,000	7,000
Hunting Use	46,000	65,000	62,000

Visitor use information was compiled by BLM utilizing the 1976 Statewide Comprehensive Outdoor Recreation Plan (SCORP).

bility in big game populations and improved hunter success on the Ignacio Chavez Grant. Impacts on the Ignacio Chavez Grant would be localized and long-term.

90. LAND ALTERATIONS (MESA DE CUBA)

The Mesa de Cuba recreation area is comprised of the Lagunitas, Penistaja and Chiuilla AMPs. The proposed fence in the Lagunitas AMP would have an adverse impact on sightseeing along the Mesa de Cuba by creating additional horizontal contrast lines. Proposed water developments (catchments, troughs, etc.) would have a beneficial impact on the recreation use of the area by providing water for wildlife needs. Proposed sagebrush burning in the Chiuilla AMP would have a short-term adverse impact on the sightseeing values of the burned area. Proposed pipelines would cause short-term scenic disturbance (two to three years) of the vegetation and topsoil along the pipeline route. Recreation use in the Chiuilla AMP area would be enhanced by the creation of additional wildlife waters. The cumulative, localized impacts in the Mesa de Cuba area would be adverse.

91. LAND ALTERATIONS (LA VENTANA)

The La Ventana recreation area is located within the Elk Springs and Coal Creek AMPs. Proposed catchments and water development would have a beneficial impact on wildlife associated recreational use of the area. The proposed seven miles of pipeline construction would cause a temporary adverse impact on the sightseeing values of the area.

92. LAND ALTERATIONS (CABEZON PEAK)

One-half mile of fence proposed within the Cabezon Peak area (Cabezon Peak AMP) would not create any disturbance of natural or scenic values. The localized impact would be negligible.

Livestock Grazing

Source of Impacts: Rest and Deferred Rotation Grazing Systems

93. INITIAL ADJUSTMENT OF LIVESTOCK AUMS

As proposed by the AMPs, livestock active licensed use AUMs in the Rio Puerco ES Area would initially be adjusted to correspond with the 1975 BLM Resource Inventory. This adjustment would involve an increase of 2,246 AUMs on 18 allotments, a decrease of 8,400 AUMs on 40 allotments, and no change on 3 allotments. The overall decrease would be 6,154 AUMs. Table III-15 shows these initial adjustments and Table III-16 summarizes these initial adjustments. The reductions would be short-term with increases projected by the year 2000. In Table III-15, column five displays livestock AUMs available at the beginning of the proposal and column six shows projected AUMs for the year 2000.

94. COMBINATION OF ALLOTMENTS

The proposed AMPs have combined 58 old allotments to form 22 new allotments (200,927 acres). Thirty-eight allotments (192,060 acres) have retained their original boundary and one area, Bama (96 acres, previously unallotted) is given an allotment number under the proposal. Combinations of allotments would have several impacts on livestock grazing in the area.

Approximately 25 percent of the AMPs proposed for combinations would combine allotments which graze different breeds of bulls. In general, licensees strive to improve or upgrade the quality of their herds and usually prefer one breed of bull over another. When livestock of different breeds are grazed together during the breeding season, crossbred calves may be produced. While this may be desirable to one operator it can be highly disagreeable to a licensee who produces a certain breed of livestock. Twenty-four operators would be affected by this.

Licensees attempting to upgrade their present herd would also be adversely affected by allotment combinations which mix registered and nonregistered bulls. Approximately 27 percent of the allotments proposed for combination (34 licensees) would be combined in this manner. Without control over the quality of bulls used by ranchers in the community allotments, calves produced from unregistered bulls would usually be inferior.

Combining licensees with seasonal and yearlong breeding programs would also create problems for the seasonal breeder. These licensees generally prefer seasonal breeding for the following reasons:

1. Single calving season (generally spring);
2. Calves can be worked (branded, dehorned, etc.) at the same time; and
3. Uniformity of calf weights and ages at weaning and shipping time.

Combination of licensees using different breeding seasons would occur on 22 percent of the allotments proposed for combination, and would involve 19 operators.

Table III-15

PROJECTED AUMs ON PUBLIC LANDS WITH THE PROPOSED ACTION

Allotment Name and No.	(1) Grazing Privilege AUMs	(2) Current Active AUMs	(3) AUMs Change* Increase	(4) AUMs Change* Reductions	(5) Livestock AUMs Available (1975)	(6) Livestock AUMs Available (2000)
Corrales Tierra (55)	120	120	-	52	68	170
Senorito (19)	152	152	-	56	96	169
Mesa Portales (17)	376	376	-	46	330	581
Nacimiento (14)	302	302	-	78	224	394
Ridge Top (24)	231	231	-	28	203	284
Salado-Tapia (51)	480	480	-	202	278	489
Arroyo Alamito (45)	504	504	234	-	738	1,492
Arroyo Piedra Parada (54)	518	518	-	80	438	771
Cachulie (39)	1,512	1,512	81	-	1,593	2,804
Cebo Community (33)	1,135	1,135	173	-	1,308	2,303
Coal Creek (29)	1,010	825	-	184	641	1,128
El Banquito (49)	1,836	1,836	-	273	1,563	3,230
Fork Rock Mesa (16)	118	118	-	53	65	114
Forty-four (18)	438	438	51	-	489	861
Gypsum Hill (61)	480	480	-	218	262	770
Lagunitas (12)	144	144	15	-	159	280
Ojo de los Pinos (8)	1,017	1,017	-	22	995	1,751
Pelon (3)	1,197	1,197	-	404	793	1,396
San Pablo (20)	431	431	-	31	400	704
Shroyer (2)	743	743	-	-	743	1,204
Arroyo Empedrado (36)	601	601	-	129	472	831
Azabache (42)	2,587	2,587	-	506	2,081	3,813
Banco de la Casa (52)	653	653	-	154	499	878
Cabezon Peak (44)	2,005	2,005	-	482	1,523	2,908
Canon del Camino (53)	904	904	-	444	460	810
Cerro Cuate (41)	488	488	-	76	412	725
Cucho Arroyo (57)	408	408	12	-	420	739
Dry Well (27)	1,544	1,544	-	531	1,013	1,783
Horn Arroyo (9)	780	780	-	125	655	913
Lost Valley (40)	1,853	1,853	505	-	2,358	4,150
Mesa Cortada (48)	576	576	29	-	605	1,544
North San Luis Mesa (37)	688	688	-	166	522	919
Pipeline (56)	1,425	1,425	323	-	1,748	2,932
Rio Salado Community (59)	745	745	27	-	772	1,388
Rock House (60)	778	778	198	-	976	1,865
San Luis Community (38)	792	792	105	-	897	1,579
San Ysidro Pasture (46)	876	876	-	132	744	1,480
Valle San Isidro (15)	728	728	-	430	298	472
Chico Crossing (43)	2,131	2,131	-	576	1,555	2,863
Continental Divide (1)	1,732	1,410	100	-	1,510	2,269
Dry Springs (5)	850	850	-	30	820	1,255
Eagle Mesa (23)	1,634	1,634	-	6	1,628	3,023
Guadalupe Community (47)	792	792	-	99	693	1,220
Penistaja (11)	3,677	3,129	15	-	3,144	5,533
Piedra Lumbre (28)	789	789	-	168	621	1,093
Torreon Wash (35)	642	642	-	48	594	801
Twin Butte (34)	1,660	1,650	-	729	921	1,621
Brandy (10)	3,602	3,602	-	387	3,215	5,809
Starr (4)	1,788	1,788	-	274	1,514	2,812
Ignacio Chavez Grant (50)	2,621	2,621	223	-	2,844	5,005
Chiuilla Community (7)	1,828	1,828	-	-	1,828	3,235
Elk Springs (30)	242	132	36	-	168	296
Mighty Mite (58)	120	120	5	-	125	253
Tres Hermanos (6)	543	543	114	-	657	1,192
Canada Candalaria (31)	920	920	-	284	636	1,119
Los Pinos Arroyo (26)	195	195	-	94	101	178
Cerro Colorados (32)	1,284	1,284	-	744	540	950
Bama (21)	0	0	-	-	0	0
Molino (13)	12	12	-	12	0	0
Rock Ridge (25)	35	35	-	35	0	0
San Miguel (22)	12	12	-	12	0	0
TOTALS	58,284	57,109	2,246	8,400	50,955	91,149

*See Table III-16 for summarization of initial adjustments in livestock AUMs.

Sources: AMP Files for Proposed Action
Existing BLM Grazing Files
Table II-45
Table III-8

TABLE III-16

INITIAL ADJUSTMENTS IN LIVESTOCK AUMS
INCREASES AND REDUCTIONS

Increases

2,246 AUMs	-	Increase in 18 allotments	(142,671 Acres)
----- AUMs	-	No change on 3 allotments	(14,058 Acres)

Reductions

8,351 AUMs	-	Reduction on 37 allotments	(235,930 Acres)
59 AUMs	-	Elimination on 3 allotments	(424 Acres)
8,400 AUMs	-	Total reduction on 40 allotments	(236,354 Acres)

Net Change

8,400 AUMs	-	Reductions
2,246 AUMs	-	Increase
6,154 AUMs	-	Proposed reduction of AUMs available for active use

Summary Total For ES Area

58,284 AUMs	-	Total grazing privileges
- 1,175 AUMs	-	Suspended non-use
57,109 AUMs	-	Active grazing privileges
-50,955 AUMs	-	1975 Resource Inventory
6,154 AUMs	-	Proposed reduction of AUMs available for active use

Active licensed used in the 1975-76 license year was 52,570 AUMs. This number would be reduced to 50,955 AUMs (date from 1975 Resource Inventory). The difference is a reduction of 1,615 AUMs from the 1975-76 license year.

Source: AMP Files for Proposed Action
Existing BLM Grazing File
Table III-15

For the most part, allotment combinations would require more work of each licensee, especially where personal conflicts arise and licensees cannot work together as a group. The excessive or increased handling of livestock may cause some weight losses and could possibly make livestock harder to handle. In situations where personal conflicts arise, the working of livestock would be on an individual basis rather than by group effort. Management of livestock would suffer. This impact due to personal conflicts cannot be quantified with existing data but would be a long-term, adverse impact.

95. Individual Allotments Not Combined

Seventy-four licensees on allotments not combined (192,156 acres) would also be affected by implementation of the proposed action. More time would be required to move cattle from pasture to pasture in accordance with grazing schedules. With the construction of new range improvements (fences, cattleguards, water developments, etc.) on most allotments in the ES Area, licensee responsibility for maintenance would increase. Operation and maintenance costs would increase by an estimated average of five to ten percent per year for each allotment. The localized long-term impacts on individual allotments not combined would be adverse.

96. Livestock Concentration In Use Pastures

Concentrated in use pastures, livestock would graze less palatable forage than would have been consumed under present conditions. Through continual search for the most palatable forage and the increased movement from pasture to pasture, livestock would also experience temporary weight loss. As forage production improves by the year 2000, this adverse impact would become negligible.

Licensees would be directly affected by livestock concentration in that additional supervision of water would be required. Because the entire allotment would not be open to livestock, water availability in individual pastures would be crucial.

Beneficial impacts resulting from livestock concentration in use pastures would be improved vegetative vigor and reproduction. There would be a more uniform pattern of forage utilization. Overall, the concentration of livestock into use pastures would be a long-term, beneficial impact on livestock grazing as a result of increased forage available for livestock.

97. Livestock Losses From Poisonous Plants

Concentration of livestock in use pastures could also cause an estimated zero to two percent loss of livestock due to poisonous plants. This would be an adverse, short-term impact (one grazing cycle/average three to five years) until vegetative conditions improve as a result of the proposed grazing systems.

98. Change In Season of Use

The proposed AMPs recommend a change from yearlong to seasonal use on four allotments (Corrales Tierra, Senorito, Salado-Tapia and Gypsum Hill—9,084 acres). Although the licensees involved have other lands available to use when public lands are closed to livestock grazing, this change would cause a localized, long-term impact.

99. Improved Forage Production

When specific objectives of the proposed AMPs are met, forage conditions in the area would improve as supported by the San Luis Watershed Study, 1972 (see Table III-15, column six for projected AUMs by allotment). Along with improved forage conditions, calf crop percentages, weight gains, and weaning/selling weights would also improve, thus benefitting the livestock operators and local economy. The increase in percent calf crop, weight gains, weaning/selling weights, etc., would vary from allotment to allotment. Actual increases in livestock production would occur in conjunction with livestock quality and good livestock management practices. Improved forage production would have a long-term, beneficial impact on livestock grazing in the area.

100. Attitude Conflicts Due To Increased Management

The proposed grazing management systems represent additional governmental controls to the livestock operators involved. The majority of licensees do not want AMPs and prefer to operate as they have in the past. This adverse impact would be short-term in the area.

Many livestock operators feel the proposed action would decrease the value of their operation due to the present uncertainties in livestock numbers (possible reductions), allotment combinations, increased governmental controls, etc. The effects on intermingled private land values may be considered adverse in the short-term and beneficial in the long-term.

Source of Impacts: Ungrazed Allotments

101. ELIMINATION OF LIVESTOCK AUMs

Sixty livestock AUMs would be eliminated on three allotments: Molino, Rock Ridge and San Miguel. These AUMs would be reserved for wildlife under the proposed action and would constitute a long-term, localized, adverse impact on livestock grazing. Licensees of these three allotments would be required to confine their livestock to their adjoining private and/or state lands or enter into exchange-of-use agreements for use of the public lands.

Forestry

Virtually all of the 3,933 acres of ponderosa pine on the Mesa Chivato (El Banquito and Ignacio Chavez allotments) is commercial forestry land. Other areas (342 acres) which have ponderosa pine include the Ojo de los Pinos, Chiuilla Community, Starr and Dry Springs allotments. These areas are capable of producing commercial quantities of ponderosa pine, as shown in a recently completed field inventory.

The proposed action would not result in any major impacts on the forestry land use. Any livestock use would result in impacts upon the forestry resource, some of which are beneficial and some adverse. The amount and concentration of use are the determining factors. In general, well-regulated livestock use is beneficial, while no use and overuse are adverse.

Source of Impact: Rest and Deferred Rotation Grazing Systems

102. VEGETATIVE COMPETITION

The Mesa Chivato area would have an increase in vegetative competition from grass plants. This can prevent or retard the establishment of ponderosa pine seedlings. However, grass plants and shrubs can also be beneficial to seedling survival by providing shade which keeps soil temperatures down. The same plants which provide this shade also compete with pine seedlings for soil moisture and nutrients. The overall localized, long-term, adverse impact of grazing would be negligible. The steeper slopes where livestock do not graze would not be impacted.

103. LIVESTOCK RUBBING

Livestock concentrations in areas of salt and water developments could damage ponderosa and sapling trees (small-pole size class). There would be breaking of the branches or main stem of the tree which results in either killing or seriously deforming the tree. The overall localized, long-term impact on the production of forest resources is expected to be minimal.

104. LIVESTOCK TRAMPLING

Trampling damage does not become acute until concentrations of livestock occur. These concentrations are only expected to occur around salt and water developments. Trampling results in damaged ponderosa pine seedlings, and seedling development may be retarded. A positive impact of trampling is that it buries seeds in the soil thereby making them more susceptible to germination. Overall, the net localized, long-term impact would be adverse; however, it would be minimal.

105. INCREASED WILDFIRE

Any increase in vegetative production, as a result of the proposed action would increase the potential for fire (see Impact 22). Since wildfires would consume more acreage than is consumed at present (an average of less than ten acres per year), there would be increased damage to the forestry resource. This would be a localized, long-term impact on all forested and forestry resource woodland areas.

Transportation Networks

Source of Impacts: Rest and Deferred Rotation Grazing Systems

106. UNAUTHORIZED LOCKED GATES

There would be a possibility of unauthorized locking of gates on public lands to prevent public travel through an area. This has been a problem in the past with approximately three or four incidents per year. Because of attitude conflicts between ranchers and BLM, unauthorized locking of gates may increase. This would be a localized, short-term, adverse impact which would be quickly resolved.

Source of Impacts: Construction and Physical Presence of Range Improvement Projects

107. IMPROVED ACCESS

The construction of cattleguards in existing fences would improve accessibility to certain areas by making it easier to travel on existing roads which are crossed by fences (see Visual C for Existing and Proposed Improvements). This would be a localized, long-term, beneficial impact.

Socio-Economics

Source of Impact: Rest and Deferred Rotation Grazing Systems

108. Implementation of AMPs

By 2000, all 134 ranch units would be operating under AMPs and there would be an overall improvement in economic conditions of ranchers. Of the total, 48 would have been operating under AMPs prior to 1975 while 86 ranch units would have been implemented after 1975. Ranchers would become more self supporting and less dependent upon outside income. This would be a long-term, beneficial impact in the area.

The ranch units would change in size and are listed below by economic category:

Ranch Size	Number (1975)	Number (2000)	Change With Proposal
Subsistence	84	60	−24
Small	42	59	+17
Medium	8	12	+4
Large	0	3	+3
Total	134	134	

109. Initial Reduction of Livestock AUMs

Sixty-eight of 134 ranch units on 40 allotments would receive an initial reduction of 8,400 AUMs from what is currently available for active use. Of the 68 ranch units, 23 (34 percent) receive primary income from ranching. The 45 others (66 percent) affected by the proposed reduction are ranch units with non-ranch earnings. The remaining 66 of 134 ranch units (23 allotments) would receive an increase of 2,246 AUMs, with some ranch units unchanged. The result would be a net reduction of 6,154 AUMs. Initial livestock numbers would be reduced overall by 513 livestock, (6,154 AUMs divided by 12 months equals 513 livestock), while the calf crop would be reduced by 359 (assuming an 70 percent calf crop). At 400 pounds each, a total weight of 143,600 pounds would mean a dollar reduction to the economy of $43,080 using a 30 cents per pound price for calves. The average AUM reduction for each of the 68 ranch operators adversely impacted would amount to a $1,634 reduction in family income.

A few of the 68 ranch units which would incur initial reduced stocking levels may find that they cannot afford to or would not be willing to stay in the livestock business. Because of increased financial hardships they may be forced to abandon their traditional way of life and enter other occupations. Once these people leave the area they probably would not be financially able to come back. This would be a localized, long-term, adverse impact.

110. Increase of Livestock AUMs by Year 2000

Actual licensed use of livestock AUMs would increase from 50,955 at initial implementation to 91,149 at the year 2000. This is a net increase of 40,194 AUMs. The net increase of livestock would be 3,350 (40,194 divided by 12). Using a 90 percent calf crop these cattle would produce an additional 3,015 calves. The calf weight projected at 430 pounds each equals 1,296,450 pounds, with projected price at year 2000 being 92.4 cents (Gray, 1976).

Total receipt of calves during the year 2000 based on livestock use of 91,149 AUMs would be $2,716,080. This is determined as follows:

91,149 AUMs divided by 12 months equals 7,596 Animal Units (AU);
7,596 (AU) multiplied by .90 (% calf crop) equals 6,836 calves;
6,836 (calves) multiplied by 430 pounds (weight/calf) equals 2,939,480 total pounds/calves;
2,939,480 (pounds) multiplied by 92.4 cents/pound equals $2,716,080.

Increase in livestock AUMs would be an area-wide, long-term, beneficial impact.

111. Increased Employment

Within the agricultural economic sector, a total of 52 new jobs would be created as a result of implementation of the proposed action in the Rio Puerco ES Area (Gray, 1976). This would be a long-term, beneficial impact.

112. Improved Recreation Resource

The proposed action would alter recreation use as follows (see Recreation):

(1) ORV visitor use days from 170,000 to 182,000,
(2) sightseeing visitor use days from 324,000 to 454,000,
(3) primitive/natural area visitor use days from 4,000 to 8,000 and
(4) hunter days from 46,000 to 65,000 (deer equal 35 percent, elk equal 20 percent, small game equal 35 percent, upland game equal 10 percent).

Using the following range of values, the impact on recreation by 2000 for the proposed action would be an increase of $821,500 to $1,450,830: ORV ($4 to $6), sightseeing ($4 to $6), primitive/natural areas ($4 to $6), deer ($11 to $25), elk ($20 to $65), small game ($11 to $20), and upland game ($8 to $15). The range of values used are those provided for conducting economic analyses of AMPs. This would be a long-term, beneficial impact in the area.

113. ELIMINATION OF LIVESTOCK AUMs

Fifty-nine livestock AUMs would be eliminated on three allotments: Molino, Rock Ridge and San Miguel. These AUMs would be reserved for wildlife under the proposed action and would constitute a localized, long-term, adverse impact on the licensees affected. Estimated loss for the year 2000 would be $1,788. This loss is based on an assumed 90 percent calf crop for five cows. Calves are projected to weigh 430 pounds. Anticipated price per pound would be 92.4 cents.

114. SOCIO-CULTURAL FACTORS

Traditional patterns of livestock ownership and management are deeply ingrained. As indicated in the economic sections, however, it is not likely that major economic impacts are possible. Similarly, based on the ranchers' attitudes and expectations, it is unlikely that major impacts on social factors would result from the proposed action.

The traditional Spanish-American economy has centered around land resources. These land resources are limited. Therefore, under current conditions with declining range conditions, additional population would

(1) be forced from the land,
(2) cause misuse and deterioration of range lands,
(3) be absorbed into a welfare culture,
(4) be employed in local industries other than agriculture, or
(5) migrate from the area.

The proposed action would alleviate some of the problems caused by population pressure. Some traditional Spanish-American people would be able to gain entry into the agricultural sector. Others, including young non-traditional Spanish-American people, would have increased opportunities to find employment near their homes.

Willingness to commute may not change if wages increase in proportion to transportation costs. The proposed action may provide more jobs closer to present home sites and thus, decrease the willingness to commute.

The proposed action is likely to cause some social instability in the area. Loss of jobs in the area due to initial reductions may occur. A total of 38 allotments would undergo a reduction in livestock numbers, and this action would cause an economic loss for the licensees involved. It is felt that the proposed action would lead to further resentment toward BLM. The licensees feel they would receive economic losses, and that the proposed action would decrease the value of their operations. Changes in socio-cultural values would occur but magnitude of input cannot be quantified.

In addition, social instability would increase through personal conflicts which arise from implementation from AMPs. Conflicts would be brought about by combinations of allotments which would require different management practices (see Livestock Impact 94).

Chapter IV

Mitigating Measures

CHAPTER IV

MITIGATING MEASURES

The measures analyzed in this chapter are actions which would reduce or eliminate adverse impacts identified in Chapter III. Each measure is analyzed in relation to a specific component of the proposed action. All measures are considered feasible under existing technology and would be required if the proposed action is approved.

Table IV-1 has three columns used to display mitigating measures. The first column identifies the impact as it appears in Chapter III. The second column is the mitigating measure to be applied. The third column is a measure of how much the mitigation measure would reduce the impact. The numbers which appear in the three columns in Table IV-1 are the same numbers which appear in Chapter III. These numbers can be used as a guide to the reader through Chapter III Impacts, Chapter IV Mitigating Measures, and Chapter V Unavoidable Adverse Impacts.

Table IV-1

MITIGATING MEASURES

Mitigating Measures In Addition To Those Included In the Proposed Action

Impacts	Mitigating Measures	Reduction Due To Mitigation
SOILS		
11. Increased Erosion	11. Obtain assistance of soil scientist in selection of sites for water development facilities in areas on Penistaja-Berent-Sandstone soil association. Areas of steep terrain or near vertical walled drainages (regardless of soil association) would also be checked.	11. By having soil scientist assist in selecting the final location of the water facilities, highly erosive areas would be avoided and would mitigate this impact by 75 to 95%.
WATER		
18. Increased Groundwater Withdrawal (Saline Water)	18. Periodically sample groundwater quality to detect changes. If significant deterioration of quality is found, reduce groundwater withdrawals as necessary to reverse the situation. Develop alternate sources of water as needed to make up for reductions in groundwater withdrawals. Ensure that all wells are properly cased and sealed to avoid mixing of water from different aquifers.	18. Mitigating measures would avoid the deterioration of the quality of groundwater aquifers by early detection and prompt corrective action. By having all wells properly cased and sealed, mixing is avoided to the extent that water mixing from different aquifers would not occur.
VEGETATION		
33. Alteration of Threatened and Endangered Plants	33. Study life processes of all identified threatened and endangered plants. Adjust grazing systems according to the needs of the threatened or endangered plants.	33. Studies of threatened or endangered plants conducted either by BLM personnel or by contract would provide the needed data to determine presence of the plants, plant responses to grazing use, identification of the life processes of the plant, and the need for any modification of grazing systems.
WILDLIFE		
36. Saline Water (Aquatic Habitat)	36. Same as #18.	36. Same as #18.
40. Saline Water (Big Game)	40. Same as #18.	40. Same as #18.
50. Saline Water (Birds)	50. Same as #18.	50. Same as #18.
63. Saline Water (Small Mammals)	63. Same as #18.	63. Same as #18.

Impacts	Mitigating Measures	Reduction Due To Mitigation
CULTURAL RESOURCES		
72. Disturbance by Livestock	72. Fence and exclude from grazing the following properties: (a) Azabache Station; (b) Guadalupe Pueblo Complex. This would require .5 miles of new fence. Excavate the San Luis Archaia site to recover information being lost to the effects of trampling and erosion.	73. Elimination of the impact at the Azabache Station and Guadalupe Pueblo Complex sites would be 100%. Excavation of the San Luis Archaic site would prevent loss of data and cultural material through erosion and trampling by documentation of data and collection of material.
74. Disturbance by Project Construction (Banco de la Casa and Guadalupe)	74. Inventory and if necessary excavate archeological site at locations where it is not possible to stay on previously disturbed surfaces. Limit the construction of the main pipelines in the Banco de la Casa and Guadalupe allotments to areas of previous surface disturbance where possible.	74. Locating the pipelines on previously disturbed surfaces would avoid the impacts identified. If excavation is necessary only destruction of material cultural items, and vertical and horizontal relationships of cultural deposits would be avoided through documentation of data and collection of material.
PALEONTOLOGY		
76. Disturbance of Morrison Formation by Project Construction	79. In future construction of range improvements on the Morrison Formation, examine surface disturbance activities with a qualified specialist. If paleontological material is discovered during construction, the work would be modified or stopped pending further authorization by the BLM District Manager.	76. With proper examination and care during construction most paleontological resources discovered could be saved.
VISUAL RESOURCES		
79. Contrast - Fences	79. Where possible, fences would be constructed along breaks in natural vegetation and would be of a color to blend with natural colors, preferably green or gray. Cattleguards would be painted most naturalistic color allowable under safety regulations (light tan). Fences would use natural vegetation and land forms to hide them from viewpoints; long fenceline tangents would be avoided.	79. Highest VRM Class objective expected to be met before mitigation is Class III. After mitigation the highest VRM Class objective which could be met is Class II.

Impacts	Mitigating Measures	Reduction Due To Mitigation
VISUAL RESOURCES (continued)		
80. Contrast - Spring Development	80. Fence posts surrounding spring developments would be painted green or gray.	80. Highest VRM Class objective expected to be met before mitigation is Class III. After mitigation the highest VRM Class objective which could be met is Class II.
81. Contrast - Water Catchments	81. The fences around catchments in wooded areas would include some trees inside the fenced area. Fence posts, when possible, would be a natural color to blend with the landscape.	81. Highest VRM Class objective expected to be met before mitigation is Class III. Application of the mitigation measure would not be enough to change the VRM Class but would reduce the contrast.
82. Contrast - Storage Tanks, Troughs, Well Sites	82. Storage tanks, troughs and well sites would be located in areas of least susceptible erosion problems. Where possible, storage tanks, troughs and well sites would be screened by natural land forms and/or vegetation.	82. Highest VRM Class objective expected to be met before mitigation is Class III. Application of the mitigation measure would not be enough to change the VRM Class but would reduce the contrast.
RECREATION		
87. Fences	87. Same as #79.	87. Same as #79.
LIVESTOCK		
94. Combination of Allotments - Personal Conflicts	94. The BLM would support formation of local grazing associations for allotments having two or more licensees. The BLM would support the local grazing association in enforcement of bylaws and rules formulated by the association and approved by the State Director, provided the bylaws and rules are consistant with BLM grazing regulations.	94. Association members by group action would be able to select quality and breed of bull, develop a system of maintenance cost sharing, work livestock as a group, develop a schedule of rotating reponsibility of licensees for livestock movement and allotment supervision, and develop plans to help reduce personality conflicts between ranchers.
100. Attitude Conflicts Due to Increased Management	100. The BLM would make more frequent contact with licensees. BLM could provide assistance during the formation of grazing associations, livestock management information, etc.	100. Attitude conflicts may be expected to decrease by the year 2000, or when grazing systems have time to prove effective and carrying capacities are increased.

Source: BLM Resource Specialists

Chapter V

Adverse Impacts That Cannot Be Avoided

CHAPTER V

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

Chapter V presents an analysis of the unavoidable adverse impacts that would result from implementation of the proposed action. These impacts are those adverse impacts remaining after application of the mitigating measures described in Chapter IV.

No adverse unavoidable impacts are analyzed for Climate, Air Quality, Geologic Setting, Topography, Water Resources, Paleontology and Mineral Resources. (Only major adverse impacts are analyzed as unavoidable.) Numbers preceding impacts are the same numbers used to identify impacts in Chapter III. It is important to read Chapter III in order to understand the following discussion of unavoidable impacts.

Soils

10. SOIL DISTURBANCE

In the ES Area, a total of 85 acres would be used for range improvements rather than vegetative production. This would constitute an unavoidable, adverse impact on vegetation.

11. INCREASED EROSION

Potential sediment yield would continue on a limited basis as a result of project construction. The potential increase in sediment yield (long-term from 85 acres, short-term from 1,069 acres) would be minor because of the scattered locations of proposed projects. The stipulations contained in construction criteria would minimize soil disturbances, and the area which would be used for projects is small when compared to the total acreage of the ES Area.

Water

16. LESS WATER AVAILABLE FOR RESERVOIRS

Increased vegetation will result in decreased runoff to existing reservoirs and pit tanks which are particularly on Christianburg-Navajo, Litle Las Lucas and Billings-Persayo soils, this effect of reduced runoff cannot be avoided.

Vegetation

25. INCREASED WILDFIRES

Historical data shows an average of three fires per year with a total of 85 acres being burned during the last 10 years. Although fire suppression activities would reduce loss of vegetation caused by wildfire, the rate of spread would be greater and would cause increased loss of vegetation per fire.

32. CONVERSION OF VEGETATIVE SUB-TYPES

Permanent change in sagebrush vegetative subtype would occur on a total of 2,525 acres through vegetative manipulation projects. The change from predominately sagebrush to predominately grass and forage browse species would be maintained for the life of the project and would occur as a result of (1) sagebrush burning, 2,045 acres; and (2) sagebrush cutting, 480 acres. This would be an adverse impact on sagebrush.

Wildlife

45. HABITAT CONVERSION

Increased wildlife/livestock competition resulting from sagebrush burning on 320 acres within the Elk Springs and Coal Creek allotments would be unavoidable. The key browse plants of mountain mahogany and four-wing saltbush would be expected to resprout following burning, thereby providing forage selected by deer, elk and livestock.

55. HABITAT CONVERSION

The proposed burn would displace approximately 22 bird species restricted primarily to the sagebrush sub-type. Seven shortgrass bird species would begin utilizing the area. There would not be complete displacement because of habitat available in islands of unburned sage.

Sagebrush burning would also affect the diversity of bird species dependent upon the middle and lower vegetation strata of the sagebrush subtype. Bird species such as the Brewer's sparrow and vesper sparrow are virtually eliminated by total sagebrush eradication. In addition to displacement of the habitat selective sparrow, many birds would be affected through loss of required perching or nesting sites provided by sagebrush vegetation (Daubenmire and Daubenmire, 1968). Modification of sagebrush vegetative strata reduces species diversity for several years until foliage density increases.

Cultural Resources

71. WILDFIRE

Impacts to the cultural resources as a result of wildfire would be unavoidable.

72. DISTURBANCE BY LIVESTOCK

With the implementation of the proposed action and the mitigating measures recommended, it is expected that adverse impacts would continue as a result of trampling and erosion. Trampling impacts cannot be completely avoided if the objectives of the proposed action are to be met. The effects of deterioration due to erosion would be reduced under the proposed action but cannot be eliminated altogether.

74. DISTURBANCE BY PROJECT CONSTRUCTION

In the Banco de la Casa and Guadalupe allotments, the mitigating measure of avoidance, staying within previously disturbed areas, inventory and excavation would not reduce the impact of contamination of the areas' religious and heritage values. This contamination would remain as an unavoidable adverse impact.

If the proposed action is implemented in areas of previous surface disturbance, only the preceding impact would result. However, if undisturbed areas could not be avoided and cultural material is discovered, the salvage operation would not recover scientific data as completely as in an extensive excavation. Lost scientific values, such as loss of a site for future study, would be an unavoidable, adverse impact.

76. DISTURBANCE OF MORRISON FORMATION

In spite of precautions taken during range improvement construction, there would probably be very little destruction of paleontological resources in the Morrison Formation. Approximately 15 acres of Morrison surface (out of a total of 23,000 acres) might be disturbed in the construction of a proposed range improvement. This destruction would constitute an unavoidable adverse impact.

Visual Resources

When the proposed action removes vegetation, disturbs the soil or places a structure on the landscape, an adverse visual impact would occur. In the Bureau of Land Management, the degree of visual impact is determined by the visual resource management contrast rating system. The mitigating measures proposed in Chapter IV would reduce the visual contrast to Class II. Regardless of how successful the mitigating measures are, there would be some modifications to the basic elements resulting in unavoidable visual impacts.

77. INCREASED WILDFIRES

Increased landscape contrasts resulting from increased wildfires would be unavoidable adverse impacts on the visual resources of the area.

78. CONTRAST

Because the proposed AMPs would use some pastures and allow others to rest, the visual contrast in vegetative growth and density would be unavoidable.

79, 80, 81, 82. CONTRAST-PROJECT CONSTRUCTION

When the proposed projects cannot be located to take advantage of natural screening, visibility would be in contrast with the natural landscape. When the soil is disturbed and vegetation removed, there is contrast created in the color and texture of the exposed area. This contrast would be unavoidable.

80, 81, 82. CONTRAST-SPRINGS, CATCHMENTS, TANKS, TROUGHS, WELLS

Spring development, water catchments and pit tanks which are fenced would allow vegetation within them to grow unchecked while the vegetation outside would be grazed. This action would visually define the fenceline and contrast the color and texture of vegetation inside and outside the fence.

Livestock would have a tendency to concentrate around the proposed water projects. Although a four foot gravel pad would be placed around troughs, an area would be trampled where livestock gather. Also, vegetation immediately adjacent to the livestock water would be affected. This would be an unavoidable visual contrast.

83. CONTRAST-VEGETATIVE MANIPULATION

Of the proposed projects, vegetative manipulation would create the greatest visual contrast. A burned or cut area would be highly visible in contrast to the surrounding landscape for a number of years. Even after the grasses and native vegetation become established, the resulting successional stage of vegetation would have a different color and texture than the surrounding untreated area.

Recreation

The proposed action would create certain adverse impacts on the environment which cannot be avoided if the proposal is implemented. These adverse impacts result from construction and maintenance of projects and cannot be entirely mitigated.

85. INCREASED WILDFIRES

Smoke as result of wildfire would be unavoidable until fire suppression is complete. This impact would occur on aesthetic recreation activities.

86, 90, 91. WATER DEVELOPMENT, MESA DE CUBA, LA VENTANA

Soil surface disturbance along the pipeline route would be unavoidable. This would be an adverse impact on sightseeing.

87. FENCES

Construction of fences in Arroyo Piedra Parada and Gypsum Hill allotments would deter ORV use. Even with mitigation, some adverse impacts throughout the area would result from fencing.

88, 90. SMOKE, CONTRAST, MESA DE CUBA

The proposed sagebrush burning would coincide with specific weather conditions (very dry and slightly windy period) which generally occur during the spring, a heavy recreation use period. The proposed burning would have an unavoidable, adverse impact on sightseeing by the presence of smoke during the time the project is being completed.

89. IGNACIO CHAVEZ GRANT

Proposed fence development would detract from the scenic qualities of the area and would cause hikers and hunters to experience an unavoidable inconvenience.

90. MESA DE CUBA

Proposed fences would detract from the scenic values of the Mesa de Cuba area. The impact would be unavoidable with the proposed action.

Livestock Grazing

93. INITIAL ADJUSTMENT IN LIVESTOCK AUMs

Forty allotments would undergo a temporary reduction in livestock numbers as a result of reduced AUMs. The overall decrease in the area would be from 57,109 to 50,955 (reduction of 6,154 AUMs).

94. COMBINATION OF ALLOTMENTS

Adverse impacts of combining 58 existing allotments into 22 new allotments could be mitigated in part by formation of BLM supported local grazing associations. However, even with local grazing associations, an unidentifiable part of the adverse impacts of different breeds of bulls, use of registered or nonregistered bulls, and season versus yearlong breeding practices, is expected to continue along with personality conflicts due to different types of ranching practices, disputes over work responsibilities, and existing feuds.

95. INDIVIDUAL ALLOTMENTS NOT COMBINED

The adverse impacts on the 38 allotments which are not combined would all be unavoidable. More time would be required to move cattle from pasture to pasture and additional range improvements would require more licensee maintenance responsibility.

96. LIVESTOCK CONCENTRATION IN USE PASTURES

Livestock movement in use pastures would cause temporary weight loss.

98. CHANGE IN SEASON OF USE

Licensees in four allotments (Corrales Tierra, Senorito, Salado-Tapia and Gypsum Hill) which have a change in season of use would experience an unavoidable, adverse impact. Licensees would have to provide additional grazing lands and forage in order to maintain their current livestock numbers.

100. ATTITUDE CONFLICTS DUE TO INCREASED MANAGEMENT

Attitude conflicts due to increased government control would be unavoidable even with more personal contact with BLM.

101. ELIMINATION OF LIVESTOCK AUMs

AUMs on three allotments would be eliminated from livestock use and reserved for wildlife. The allotments are Molino, Rock Ridge and San Miguel. Loss of these AUMs would constitute an unavoidable impact on licensees.

Forestry

105. INCREASED WILDFIRES

Intensive grazing systems such as rest and deferred rotation would bring about an unavoidable increased fire hazard on ponderosa pine and pinyon-juniper caused by accumulation of ground cover.

Socio-Economics

109. INITIAL REDUCTION OF LIVESTOCK AUMs

All adverse socio-economic impacts would result from decreased AUMs. Approximately 50 percent of the total ranch operators (68 out of 134) in the Rio Puerco ES Area utilize land on the

40 allotments which would undergo AUM reductions at initial implementation phase of the proposed action. These 68 operators would experience a total reduction of 6,154 AUMs. This equals 513 livestock. Based on an 70 percent calf crop, this would mean a reduction of 359 calves at a weaning weight of 400 pounds. Using an average price of 30 cents per pound for calves, this amounts to a $43,080 reduction to livestock operators. Forty- five of the operators affected would be forced to depend more completely on non-ranch income for family livelihood. The average AUM reduction for each ranch operator impacted would amount to a $634 reduction in family income.

A few of the 68 licensees incurring initial reduced stocking levels may find they could not afford to or would not be willing to stay in the livestock business. Because of increased financial hardships they may be forced to abandon their traditional way of life and enter other occupations. Once these people leave the area, they probably would not be financially able to come back.

113. ELIMINATION OF LIVESTOCK AUMs

Elimination of 59 livestock AUMs on three allotments (Molino, Rock Ridge, and San Miguel) would cause an estimated loss of $1,788 for the year 2000. This is figured by using 90 percent calf crop for five cows with calves weighing 430 pounds with the price per pound of 92.4 cents.

114. SOCIO-CULTURAL FACTORS

The AMP implementation is likely to cause some social instability in the ES Area. Loss of jobs due to AUM reductions may occur. Conflicts between BLM and licensees may continue to increase due to increased governmental controls.

Chapter VI

Short-Term Use Versus Long-Term Productivity

Chapter VI

Short-Term Use Versus Long-Term Productivity

CHAPTER VI

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

This chapter analyzes the trade-offs between short-term use and long-term productivity of individual resources involved in the proposal. For this purpose, the short-term is five years, which is the period required to put the grazing management program into full operation. All scheduled activities would be in progress and physical range improvements would be in place. Long-term refers to the year 2000, by which time the objectives outlined in Chapter I would be achieved. By that year, any environmental effects from the program would have had about two decades to develop.

Summary and Conclusions

Table VI-1 lists specific trade-offs for the various resources. Over the long-term when cumulative trade-offs are considered, the net effect on the natural environment would be an improvement for twelve resources, and no change for five resources. The net effect on the natural environment over the long-term for the proposed action would be an improvement in environmental quality and increased productivity.

Table VI-1

SUMMARY OF TRADE-OFFS: SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

RESOURCE	SHORT-TERM	LONG-TERM	TRADE-OFFS	NET EFFECT ON THE NATURAL ENVIRONMENT OVER THE LONG-TERM
CLIMATE	None.	None.	None.	No Change
AIR QUALITY	There would be a slight increase in pollutants (exhaust fumes and dust) resulting from (1) construction of range improvements and (2) concentration of livestock in use pastures.	There would be a decrease in pollutants (exhaust fumes and dust) resulting from improved vegetative response. Vegetation would protect the soil and thereby diminish dust particles in the air.	A short-term increase in pollutants would be traded off to develop the grazing program. Long-term, there would be a decrease in pollutants.	Improvement
GEOLOGIC SETTING	None.	None.	None.	No Change
TOPOGRAPHY	None.	None.	None.	No Change
SOILS	There would be a slight increase in soil loss resulting from (1) construction of range improvements on 3,594 acres and (2) concentration of livestock in use pastures.	There would be a decrease in soil loss as vegetation gains in vigor. Eighty-five acres used for range improvements would be lost permanently.	Short-term increases in soil loss would be traded off to develop the grazing program. Long-term, the grazing program would reduce soil loss considerably.	Improvement
WATER RESOURCES	There would be a slight reduction in water quality with a slight increase in sediment yield due to the construction of range improvements and the concentration of livestock. During the short-term, there would be increased runoff which would result in a lower on-site recharge of groundwater.	There would be a 25% reduction in peak runoff due to additional ground cover (mainly litter) as vegetation gains vigor. This ground cover would slow the rate at which the water flows allowing it to enter the soil instead of running off the site. The slower rate of flow would cause less sediment to be carried in the water thereby improving water quality. The decreased rate of flow would allow for increased on-site recharge of groundwater.	A reduction in water quality and on-site recharge would be traded off for the grazing program in the short-term, to get improved water quality and increased on-site groundwater recharge over the long-term.	Improvement

Table VI-1 (continued)

RESOURCE	SHORT-TERM	LONG-TERM	TRADE-OFFS	NET EFFECT ON THE NATURAL ENVIRONMENT OVER THE LONG-TERM
VEGETATION	There would be destruction of 1,069 acres of vegetation and damage to 2,525 acres due to vegetative manipulation. On 219,432 acres grazed in the critical periods (spring and summer) the concentration of livestock would interfere with vigor, health, production of seed and the establishment of new seedlings. The concentration of livestock would increase soil disturbance, restricting root growth and the infiltration of water needed for plant growth.	There would be a permanent loss of 85 acres of vegetation due to range improvements. On 392,563 acres the long-term effects of implementing grazing systems would increase the perennial grass production approximately 100% to 250% depending on the present condition. There would be increases in ground cover, and a gradual change in composition of plant species on areas of deterioration. The increased production would leave additional vegetation on the ground which would help retain moisture, add nutrients to the soil, and improve root growth.	Vegetation destruction resulting from range improvements would be traded off to develop the grazing program. Short-term reduction of vigor and general health on 219,432 acres grazed during critical periods would be traded for long-term improvement in vigor, health, seed production and seedling establishment. Total forage including that reserved for wildlife, livestock and watershed protection would increase by a minimum of 100%.	Improvement
WILDLIFE	Construction of range improvements, vegetative manipulation and concentration of livestock would reduce wildlife habitat by 1%. There would be reduced cover and food in the grazed pastures, especially during the spring and summer periods when young are being reared. Competition would be increased over the short-term in the spring and winter periods when livestock and big game use areas overlap. The fences (65.9 miles) would cause minor restrictions in wildlife movement.	Increased vegetation would increase available wildlife forage and would promote the projected increase in abundance and diversity of all species. Livestock/wildlife competition would be decreased during the spring and winter periods where use areas overlap. The 65.9 miles of fence would still cause slight restrictions in wildlife movements; however, with the projected increase in forage and the new water sources, restricted movement would not be as adverse as over the short-term.	One percent reduction in habitat would be traded for improved habitat and increased numbers and diversity of all species. Although 65.9 miles of fence would slightly restrict wildlife movement, the benefits of additional forage and water developments would offset this restricted movement to a large extent.	Improvement

Table VI-1 (continued)

RESOURCE	SHORT-TERM	LONG-TERM	TRADE-OFFS	NET EFFECT ON THE NATURAL ENVIRONMENT OVER THE LONG-TERM
CULTURAL RESOURCES	Erosion is the most destructive force which affects cultural site deterioration. Since short-term increases in soil loss are expected, erosive loss of cultural sites would be accelerated. Concentrations of livestock would also accelerate site deterioration.	Over the long-term, watershed conditions would be improved (see Soils and Water) contributing to the protection of cultural resources. Loss of cultural sites due to erosion would decrease, although loss due to livestock concentrations would continue, to a lesser degree.	Short-term increased erosion and livestock concentrations would increase cultural site deterioration slightly. Increased erosion would be traded for grazing systems designed to improve the watershed conditions and decrease the rate of cultural site deterioration.	No Change
PALEONTOLOGY	Fifteen acres of the Morrison Formation could be disturbed. Actual loss of paleontological values would be slight, if at all.	Over the long-term, watershed conditions would be improved (see Soils and Water) contributing to the protection of paleontological resources.	Short-term (slight) loss of paleontological values would be traded for grazing systems designed to improve watershed conditions and decrease the rate of erosion of the Morrison Formation.	Improvement
VISUAL RESOURCES	There would be adverse contrast on 1,069 acres where range improvements and roads would be built and on the 2,525 acres where vegetative manipulation would take place. Adverse visual contrast would be seen between areas rested yearlong (112,253 acres) and areas grazed during the year.	There would be a permanent adverse visual contrast on 85 acres where range improvements and roads would be built and where no revegetation would be expected. Continued adverse visual contrast would be seen between areas rested yearlong and areas grazed during the year; however, improved vegetative production would reduce the adverse effect from that anticipated during the short-term.	Increased adverse visual contrast would be traded off to achieve a grazing system designed to improve the overall appearance of at least 25% of the areas with yearlong rest. This would involve a contrast with 75% of the area which receives some use during the year. This contrast would be adverse to some and very pleasant to others; however, in areas of Allotment Management Plans which are in existence today, the visual contrast is insignificant after the short-term.	Improvement

Table VI-1 (continued)

Page 4 of 5 Pages

RESOURCE	SHORT-TERM	LONG-TERM	TRADE-OFFS	NET EFFECT ON THE NATURAL ENVIRONMENT OVER THE LONG-TERM
RECREATION	Recreation use is tied closely to the other resources. Some recreational uses would increase during the short-term, others would decrease, and the net change short-term would be negligible.	Recreation use would be tied to the other resources. It is expected that a 30% increase in recreational use of the area would take place over the long-term due to the proposal.	Hunting may decline as wildlife habitat is lost over the short-term. Other uses (such as ORV use) would increase as people find the area more desirable due to increased erosion during the short-term. Trade-off would be between recreational uses with increases and decreases with an overall 30% increase.	Improvement
MINERAL RESOURCES	None.	None.	None.	No Change
LIVESTOCK GRAZING	Licensed livestock AUMs would be reduced for 68 licensees on 40 allotments. This would balance forage production with livestock use.	All licensees would receive increases in licensed livestock use as soil productivity and vegetation increase in response to the grazing systems.	Sixty-eight licensees on 40 allotments taking reductions of AUMs over the short-term. In the long-term, all licensees would realize a gain of 40,194 AUMs over and above the short-term loss.	Improvement
FORESTRY	None.	Increased survival of young ponderosa pine seedlings due to grazing management.	None.	Improvement
TRANSPORTATION	None.	Improved transportation system.	None.	Improvement

Table VI-1 (continued)

Page 5 of 5 Pages

RESOURCE	SHORT-TERM	LONG-TERM	TRADE-OFFS	NET EFFECT ON THE NATURAL ENVIRONMENT OVER THE LONG-TERM
SOCIO-ECONOMICS	The government would spend approximately 2 million dollars for the range improvements (material and labor) needed to develop the grazing program as outlined in the proposed action. In the short-term, 68 licensees would lose $43,080 income as a result of decreases in allowable livestock use, from active available privileges. There would be increased costs to both licensees and the government to maintain range improvements and ensure that the grazing systems are being followed.	There would be increased range related income of $1,296,450 as a result of 40,194 additional AUMs, increased calf crops and improved weaning weights. The increase in recreational use would provide an additional $821,500 to $1,450,830 in the area economy.	A hardship would be placed on 68 licensees who would receive reductions in the short-term. Some may be forced out of business due to this hardship and have to find other means to make a living. All licensees would realize an increase in range related income over the long-term due to increased sales.	Improvement

Source: Summarized from Impacts, Chapter III

Chapter VII

Irreversible and Irretrievable Commitment of Resources

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This chapter identifies the extent to which the proposed action would irreversibly curtail the potential uses of the land and resources. In this context the term irreversible is defined as incapable of being reversed. Once initiated, use would continue. The term irretrievable means irrecoverable; not reasonably retrievable; once used, it is not replaceable.

One cultural site, excavated and salvaged as a direct result of the proposal, would represent an irretrievable commitment of a non-renewable resource. Any construction that disturbed the surface and encountered cultural materials would cause these resources to be preserved only as data; sites would be destroyed and removed from context. Scientific study of these sites would result in new information about cultural resources in the area but once excavated, the sites would not be available for future study. Although there may be other similar cultural sites and values at other locations, the loss of these particular resources would be considered an irretrievable commitment.

Soil nutrients, a part of the soil resource, would be absorbed and incorporated into forage plants which would be eaten by livestock to produce animal tissue (beef). Livestock would then be moved to other areas for human consumption and soil nutrients would be lost to the site. Although the amounts of soil nutrients lost are thought to be small, the long-term, cumulative effect could be important. This would represent an irretrievable commitment.

The spending of approximately $2,000,000 and time (labor) associated with the installation, maintenance and administration of the proposal would be an irretrievable commitment. Funds used on this project would not be available for other programs. Labor too, once used, would be irretrievable.

Chapter VIII

Alternatives to the Proposed Action

CHAPTER VIII

ALTERNATIVES TO THE PROPOSED ACTION

Introduction

Chapter VIII discusses five alternatives to the proposed action:

(1) no action;
(2) no grazing;
(3) short-term non-use;
(4) forage maximization; and
(5) pasture level stocking.

No allotment has met the criteria for the custodial management alternative; therefore, it has not been presented. The criteria for this alternative are as follows:

(1) present range condition is acceptable;
(2) BLM is satisfied with present level of management;
(3) no overriding resource conflicts are involved; and
(4) only a small amount of public land involved in the allotment.

Under all alternatives there would be a continuation of management functions for timber, wildlife, minerals, recreation, and other non-grazing resources. Table VIII-1 is a tabular comparison of the proposed action and the five alternatives as they compare to the existing environment.

No Action

Description

Under the no action alternative, livestock grazing would continue at the present level of management. The alternative would not affect Climate, Geologic Setting, Topography, or Mineral Resources. Effects on Transportation Networks would be the same as in the proposed action. The assumptions for this alternative are as follows:

1. As in the proposed action, adjustments in the authorized stocking rates would be made to balance forage use with forage production in accordance with the 1975 BLM Resource Inventory.
2. The 21 allotments which have implemented Allotment Management Plans (AMPs) on 143,865 acres of public lands would be intensively managed, while non-AMP allotments covering 249,218 acres of public lands would be managed as they are at present. Six allotments for which AMPs have been written but not implemented would be managed as non-AMP allotments and are included in the non-AMP acreage figure. See Table II-35, which shows allotments with AMPs and narrative immediately following Table II-35 which shows the six allotments not implemented.
3. New range improvements such as fences, water developments and livestock facilitating projects, would be limited to those scheduled on the 21 implemented AMPs or those authorized under Section 4 permits and cooperative agreements. Range improvements remaining to be completed on the 21 implemented AMPs are as follows: Fences, 2.2 miles; wells, 3 each; pipeline, 34 miles; troughs, 17 each; storage, 1 each (10,000 gallons); reservoirs, 15 each (56,500 cubic yards); catchments, 4 each; springs, 9 each; livestock trail, .3 miles.
4. Trespass and crossing permits would be handled in the same manner as in the existing environment.
5. It is projected that the need for road easements would be the same as with the proposed action.

Table VIII-2 shows environmental impacts of the no action alternative. To aid in tracking, impacts have been numbered consecutively. Table VIII-2 summarizes these numbered impacts by resource. In addition Table VIII-2 displays; (l) whether an adverse impact is partially or totally mitigated by mitigating measures; (2) whether an impact (or part of an impact) is analyzed as an unavoidable, adverse impact. (Only major adverse impacts are analyzed as unavoidable.) Table VIII-3 summarizes the impacts by allotment.

Impact Analysis

Air Quality

Source of Impacts: Continuation of Existing Grazing System

1. INCREASED DUST

Under the no action alternative, vegetative production would decrease and overall soil conditions would deteriorate on non-AMP allotments. As a result of this, more soil would be exposed, thus producing more particulate matter in the air on windy days. Quantification of the impact is not available, but increased dust would be a localized and long-term, adverse impact.

Soils

Source of Impact: Continuation of the Existing Grazing System

2. INCREASED SEDIMENT YIELD

Under the no action alternative, forage production on non-AMP areas would continue to decline with concurrent losses of total ground cover. (See Table II–44 which shows substantial reductions in vegetative ground cover for the Big sagebrush, Greasewood and shortrgrass vegetative subtypes.) Reduced ground cover would introduce higher runoff rates which would increase sediment yields by as much as 510 tons per square mile per year in the Billings-Persayo Soil Association.

In AMP areas, vegetative productivity would improve with an increase in total ground cover and surface protection. The increased total ground

Table VIII-1

COMPARISON OF IMPACTS FOR MAJOR RESOURCE COMPONENTS

Proposed Action and Alternatives

Area of Impact	Unit of Measure	Existing Environment	With Proposal -2000	No Action -2000	No Grazing -2000	Short-Term Non-Use -2000	Forage Maximization -2000	Pasture Level Stocking -2000
SOILS								
Sediment Yield by Soil Association	tons/sq.mi./yr.							
Christianburg-Navajo		1,530	990	1,690	990	990	990	990
Litle-Las Lucas		1,170	900	1,280	900	900	900	900
Penistaja-Berent-Sandstone		810	630	810	630	630	630	630
Basalt Outcrop-Cabezon-Torreon		630	450	630	450	450	450	450
Billings-Persayo		1,620	1,170	2,130	1,170	1,170	1,170	1,170
Travessilla-Persayo		1,170	900	1,260	900	900	900	900
WATER RESOURCES								
Storm Runoff	Percent Change	0	-25	+15	-25	-25	-25	-25
Groundwater Withdrawal	Acre Feet	55	115	80	35	115	140	115
Sediment Loss Due To Failure of Small Dams	Acre Feet	0	0	500	0	0	0	0
VEGETATION								
Production Compiled at 50% Utilization of Key Forage Species for Grazing Animals	AUMs Produced On Public Lands and All Private and State Lands Used In Conjunction With These Public Lands	69,446	121,788	75,888	94,995	121,788	133,285	121,788
WILDLIFE								
Deer	Permanent Habitat for Population In Numbers	750	1,125	560	1,012	900	1,125	1,125
Deer	Winter Habitat for Population In Numbers	1,150	1,725	950	1,725	1,100	1,500	1,725
Elk	Permanent Habitat for Population In Numbers	20	40	15	40	40	40	40
Elk	Winter Habitat for Population In Numbers	125	175	110	175	110	150	175
Pronghorn	Habitat for Population In Numbers	85	228	50	190	228	228	228
Turkey	Habitat for Population In Numbers	75	150	20	150	60	75	150
Doves	Habitat for Population In Numbers	90,000	95,000	80,000	100,000	90,000	85,000	95,000
Quail	Numbers	Low Decreasing	Increasing	Decreasing	Increasing	Static	Increasing	Increasing
Waterfowl and Shorebirds	Use Periods	30,000	60,000	30,000	65,000	35,000	60,000	60,000
Coyotes	Numbers	2,200	2,200	2,200	2,500	2,200	2,200	2,200
Bobcats	Numbers	400	400	400	400	400	400	400
Badger	Numbers	500	600	600	600	600	600	600

(continued)

Table VIII-1 (continued)

Area of Impact	Unit of Measure	Existing Environment	With Proposal -2000	No Action -2000	No Grazing -2000	Short-Term Non-Use -2000	Forage Maximization -2000	Pasture Level Stocking -2000
WILDLIFE (continued)								
Reptiles and Amphibians	Numbers	Static	Static	Static	Static	Static	Decreasing	Static
Arthropods	Numbers	Static	Static	Static	Static	Static	Static	Static
Passerine Birds								
Grassland Species	Habitat	Decreasing	Increasing	Decreasing	Increasing	Decreasing	Increasing	Increasing
Brushland Species	Habitat	Increasing	Decreasing	Increasing	Increasing	Static	Decreasing	Decreasing
CULTURAL RESOURCES	State of Preservation of CR Sites	85.5 Percent Poor Condition	Increasing deterioration at less than existing rate	Increasing deterioration at existing rate	Increasing deterioration at less than rate under the proposed action	Increasing deterioration at same rate as proposed action	Increasing deterioration at greater rate than proposed action or the other alternatives	Increasing deterioration at less than existing rate
VISUAL RESOURCES	Class Change Grazing	0	Improvement	Deterioration	Improvement	Improvement	Improvement	Improvement
	Class Change Range Projects	0	Deterioration	Deterioration	Improvement	Deterioration	Deterioration	Deterioration
RECREATION								
ORV Use	Visitor Days	170,000	182,000	191,000	176,000	182,000	191,000	182,000
Sightseeing Use	Visitor Days	324,000	454,000	433,000	476,000	450,000	389,000	454,000
Primitive/Natural Areas Use	Visitor Days	4,000	8,000	7,000	9,000	8,000	7,000	8,000
Hunting	Visitor Days	46,000	65,000	62,000	68,000	64,000	52,000	65,000
LIVESTOCK GRAZING								
Livestock AUMs (Active Privileges) On Public Lands	AUMs	57,109 [1]	91,149	57,511	0	91,149	102,646	91,149
Allotments	Numbers							
	W/O AMP	69	4	75	0	4	4	4
	With AMP	27	57	21	0	57	57	57
MINERAL RESOURCES	Amount Change	Activity Increasing	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
FORESTRY	Regeneration	No Effect (Limited)	Improvement	No Effect	Declining	Improvement	Declining	Improvement
	Fire Potential	No Effect (Limited)	Increasing	No Effect	Increasing	Increasing	Increasing	Increasing
TRANSPORTATION NETWORKS	New Easements	0	+142	+142	+142	+142	+142	+142
SOCIO-ECONOMICS								
Sale of Calves On Public Lands	Total Dollars per Year	399,720	2,716,080	773,444	0	2,716,080	3,058,966	2,716,080
Size of Ranch	Number of Subsistence Ranches	84	60	89	81	60	47	60
	Small	42	59	20	15	59	55	59
	Medium	8	12	8	8	12	25	12
	Large	0	3	2	0	3	7	3
	TOTAL	134	134	119	96	134	134	134

---

[1] 57,109 AUMs represents active grazing privileges available for livestock use during the 1975-76 license year. It should not be confused with the 50,955 AUMs determined to be available by the 1975 BLM Resource Inventory.

Source: Summarized from Chapters II, III and VIII

Table VIII-2

SUMMARY OF ANTICIPATED IMPACTS BY RESOURCE

No Action Alternative

Resource	Source of Impact	Impact		Magnitude of Impact		Mitigating Measures	Unavoidable Adverse Impacts
Air Quality	Continuation of Grazing System	1	Increased Dust	Localized long-term	-	No	Yes
Soils	Continuation of Grazing System	2	Increased Sediment Yield	Localized long-term	-	No	Yes
		3	Expanded Critical Erosion Areas	Localized long-term	-	No	Yes
	Range Improvements	4	Less Soil Erosion	Localized long-term	+	No	No
Water Resources	Continuation of Grazing System	5	Increased Peak Runoff	Localized long-term	-	Yes	Yes
		6	Increased Potential for Dam Failure	Localized long-term	-	Yes	Yes
		7	Reduced Water Quality	Localized long-term	-	No	Yes
		8	Increased Groundwater Withdrawal	Localized long-term	-	No	Yes
Vegetation	Continuation of Grazing System	9	Change in Forage Production	Area-wide long-term	±	No	Yes
Wildlife	Range Improvements	10	Extension of Aquatic Habitat	Localized long-term	+	No	No
	Continuation of Grazing System	11	Reduction of Big Game Habitat	Localized long-term	-	Yes	Yes
		12	Reduction of Game Bird Habitat	Localized long-term	-	Yes	Yes
		13	Change in Furbearer Populations	Area-wide long-term	+	No	No
		14	Improved Wildlife Habitat	Localized long-term	+	No	No
Cultural Resources	Continuation of Grazing System	15	Increased Soil Erosion	Localized long-term	-	No	Yes
	Range Improvements	16	Disturbance	Localized long-term	-	Yes	Yes
Paleontology	Construction of Projects	17	Disturbance of Morrison Formation	Localized long-term	-	Yes	Yes
Visual Resources	Continuation of Grazing System	18	Contrast (Grazing System)	Area-wide long-term	-	No	Yes
	Range Improvements	19	Contrast (Range Improvements)	Localized long-term	-	Yes	Yes
Recreation	Construction of Grazing System	20	Altered Recreation Quality and Use	Localized long-term	-	No	Yes
Livestock Grazing	Continuation of Grazing System	21	Initial Reduction of AUMs	Area-wide short-term	-	No	Yes
		22	Increased AUMs on AMP Areas	Localized long-term	+	No	No
		23	Decreased AUMs on Non-AMP Areas	Localized long-term	-	No	Yes
Forestry	Continuation of Grazing System	24	Rubbing and Trampling	Localized long-term	-	No	Yes
		25	Reduced Cover and Litter	Localized long-term	-	No	Yes
Socio-Economics	Continuation of Grazing System	26	Decline in Ranch Operations	Localized long-term	-	No	No
		27	Increased Returns	Area-wide long-term	+	No	No
		28	Reductions in Employment	Area-wide long-term	-	No	No
		29	Recreation	Area-wide long-term	+	No	No

+ Positive Impact
- Negative Impact

Source: Summarization of No Action Alternative

Table VIII-3

SUMMARY OF IMPACTS BY ALLOTMENT

No Action Alternative

Allotment Name	Allot. No.	Impact Number 6	17	19	21	24
Pelon Community *	1				X	
Starr Community *	2				X	
Martinez Bros. *	3					
Dry Springs *	4					
Gutierrez Family *	5					
Shroyer Community *	7			X		
Chiuilla Community*	8			X		
Rudolph Velarde *	9			X	X	
Valle *	10					
Eugene Johnson *	11			X	X	
Sisto Sandoval *	16			X	X	
Salaz Bros. *	18				X	
Padilla Bros. *	34			X	X	
A. Garcia Est. *	38				X	
A & A Cattle Co. *	39				X	
Guadalupe Trujillo *	41				X	
San Luis Community *	53			X		
Ojo del Padre *	66			X		
San Luis Pasture *	77			X		
Christianson *	80		X	X		
Macario Maestas *	84		X	X		
San Ysidro Grant Community *	91					
South Divide	6	X			X	X
Lagunitas Community	12	X				
Procopio Ramirez	13	X			X	
Senorita	14	X			X	
La Ventana	15	X				
Eagle Mesa	17	X				
Chacon	19				X	
Smokey	20				X	
DeHerrera Bros.	21	X			X	
Louis Wiese	22	X				
Vigil Bros.	23	X			X	
Wilson Canyon	24	X				
San Pablo	25	X			X	
Max Carabajal	26	X			X	
Los Pinos	27	X			X	
Andres Maestas	28	X			X	
Piedra Lumbre	29	X				
Brodrick Place	30	X				

Allotment Name	Allot. No.	Impact Number				
		6	17	19	21	24
Ubaldo Maestas	31	X				
Guillermo Maestas	32	X			X	
S.V. Houston Est.	33	X			X	
Elk Springs	35	X				
S. Casaus	36	X			X	
Manuel Montoya	37	X			X	
Marquez & Barboa	40	X			X	
Ignacio Velarde Est.	42	X			X	
G. Montoya	43	X			X	
Juan Maestas	44	X			X	
John Segura	45	X			X	X
Hack Wiseman	46	X			X	X
Cebo Community	47	X				
E. Lovato	48	X			X	
San Luis Mesa	49	X			X	
Torreon Wash	50	X			X	
North Pasture	51	X				
San Luis Place	52	X			X	
Aparcio Lovato	54	X			X	
M & S Montoya Grant	55	X				
Keith Elkins	56	X			X	
Seccion	57	X				
Empedrado	58	X			X	
Cerro Cuate	59	X			X	
Robert Taylor	60	X			X	
Chico Crossing	61	X			X	
Guadalupe Community	62	X			X	
Cabezon Community	63	X			X	
Ignacio Chavez Grant	64	X				
El Banquito	65				X	X
Cerro Salado	67	X			X	
Vidal Loddy	68	X			X	
Garcia	69	X			X	
C & R Griego	70	X			X	
Romero Bros.	71	X			X	
E. B. Sanchez	72	X				
Cerro Tinaja	73	X			X	
Elfego Aranda, Jr.	74	X				
Casa Salazar	75	X				
Pula Pasture	76	X			X	
Aker Pasture	78	X				
San Ysidro Pasture	79	X			X	
Corrales Tierra	81	X			X	
Ojo del Espiritu	82	X			X	
F. Sandoval	83	X				

	Allot.	Impact Number				
Allotment Name	No.	6	17	19	21	24
Tenorio Community	85	X				
Max Tachias, Sr.	86	X				
D. Lucero	87	X				
Zia Pueblo	88	X			X	
B. Garcia	89	X			X	
Henry Perea	90	X				
Manuelita Garcia	92	X				
Fermin Marquez	93	X				
Sifredo Romero	94	X				
State Section	95	X			X	
Canon Tapia	96	X			X	

Impacts which occur on all allotments, AMP and Non-AMP; 9, 10, 13, 18, 23, 27, 28 and 29.

Impacts which occur on all AMP allotments; 4, 14, 16 and 22.

Impacts which occur on all Non-AMP allotments; 1, 2, 3, 5, 7, 8, 11, 12, 15, 20, 25 and 26.

* AMP Allotments

Source: Summarized from description of No Action Alternative and Impacts.

cover would reduce erosional forces and there would be less sediment yield (San Luis Watershed Study, 1972).

Because the allotment acreage without AMPs exceeds that with AMPs by approximately 105,000 acres, the overall effects would be an increase in sediment yield as shown in Table VIII–4.

Potential sediment yield from four-wing saltbush and greasewood vegetative sub-types would be 50 percent greater than under existing conditions. Potential increases from shortgrass subtypes on the Billings-Persayo soil association would be approximately 20 percent in the northern portion of the ES Area and 66 percent in the southern portion. This difference could be due to varying weather conditions in the respective areas. Soils containing large volumes of rock on or near the surface (Penistaja-Berent-Sandstone and Basalt Outcrop-Cabezon Torreon soil associations) would reflect smaller potential sediment yield changes. The remaining soil associations would have potential increases regardless of vegetative sub-type (calculated by BLM from Cabezon Soil Survey, Soil Conservation Service). This increase in sediment yield would be a localized, long-term, adverse impact.

3. EXPANDED CRITICAL EROSION AREAS

Implementation of the no action alternative would cause critical erosion areas to expand from 34,254 acres to 59,678 acres on non-AMP allotments (see Map II-15, Future Environment, Soils). This would be a localized, long-term, adverse impact resulting in loss of soils.

Source of Impact: Construction and Physical Presence of Range Improvements

4. LESS SOIL EROSION

Range improvements, although limited to the 21 allotments with AMPs and those projects allowed through cooperative agreements, would improve livestock distribution which would increase vegetation and reduce soil erosion. This would be a localized, long-term, beneficial impact.

Water Resources

Source of Impacts: Continuation of Existing Grazing System

5. INCREASED PEAK RUNOFF

Under the no action alternative, peak runoff rates would increase on areas without AMPs (249,218 acres), and would decrease on areas with AMPs (143,865 acres). About two-thirds of the ES Area (non-AMPs) would experience runoffs averaging 25 percent higher than the present flows. The remainder of the area (with AMPs) would show a decrease of about 25 percent (U.S. Forest Service, San Luis Watershed Study, 1972). These rates would vary with different soil associations and vegetative sub-types.

Increases in peak runoff would range from zero on ponderosa pine in the Billings-Persayo soil association, to 140 percent on four-wing saltbush in the Christianburg-Navajo soil association. Decreases in peak runoff would range from zero on most vegetative sub-types in rocky soils, to 100 percent on big sagebrush in the Litle-Las Lucas soil association. The overall effect would be a 15 percent increase in peak flow (calculated by BLM from Soil Conservation Service Flood Hydrograph Method). Average of predicted changes of peak flow by vegetative sub-type and soil association is shown in Table VIII-5. Increased peak runoff would be a localized, long-term, adverse impact.

6. INCREASED POTENTIAL FOR DAM FAILURE

Higher peak flows would increase sediment yield from non-AMP areas. Some of this sediment would be captured in existing stock ponds, thereby reducing their water storage capacity. The combinations of reduced storage capacity and higher runoff might produce a flow exceeding the spillway design capacity of small dams on Christianburg-Navajo, Litle-Las Lucas, Billings-Persayo, and Travesilla-Persayo soil associations. (See Visuals B and C for the location of dams in relation to soil associations.) This could lead to failure of the dams, loss of their accumulated sediments, and heavy downstream erosion. BLM estimates that about half of the existing small dams are in danger of failure under these conditions. Potential sediment loss from these dams is estimated at 500 acre feet, or about 0.8 million cubic yards. This would be a localized, long-term, adverse impact.

Table VIII-4

ESTIMATED WEIGHTED AVERAGE SEDIMENT YIELD FOR ASSOCIATIONS WITHIN RIO PUERCO ES AREA

No Action Alternative

Soil Association	Square Miles	Present Yield (tons/sq.mi./yr.)	Predicted Yield (Year 2000) (tons/sq.mi./yr.)	Difference (tons/sq.mi./yr.)
Christianburg-Navajo	50.4	1,530	1,690	+160
Litle-Las Lucas	146.9	1,170	1,280	+110
Penistaja-Berent-Sandstone	138.6	810	810	0
Basalt Outcrop-Cabezon-Torreon	49.2	630	630	0
Billings-Persayo	145.9	1,620	2,130	+510
Travessilla-Persayo	268.9	1,170	1,260	+ 90

Source: Calculated by BLM Staff Specialist from Cabezon Soil Survey, Soil Conservation Service, 1971.

TABLE VIII-5

ESTIMATED PEAK RUNOFF FROM THE 10 YEAR STORM WITH NO ACTION

(1) COMPUTED PEAK FLOW IN CFS/MI^2

Vegetative Sub-Type	Existing Situation	No Action Year 2000	Percent Change
Ponderosa pine	110	120	+ 9
Big sagebrush	80	100	+25
Four-wing saltbush	180	240	+33
Greasewood	205	240	+17
Shortgrass	200	240	+20
Broom snakeweed	220	240	+ 9
Pinyon-juniper	125	140	+12
Steep and rocky	550	550	0
Barren	445	445	0

(2) COMPUTED PEAK FLOW IN CFS/MI^2

Soil Association	Existing Situation	No Action Year 2000	Percent Change
Christianburg-Navajo	180	220	+22
Litle-Las Lucas	140	180	+29
Penistaja-Berent-Sandstone	160	160	0
Basalt Outcrop-Cabezon-Torreon	300	300	0
Billings-Persayo	140	180	+29
Travessilla-Persayo	200	220	+12

(1) Weighted Average From Six Soil Associations
(2) Weighted Average From Nine Vegetative Sub-Types

U.S. Department of Agriculture; Soil Conservation Service; Forest Service; Energy Resources Satellite, 1974

Source: BLM Staff Hydrologist
BLM Staff Soil Scientist

7. REDUCED WATER QUALITY

The quality of surface water would change, but not enough to affect water use by grazing animals. Runoff from non-AMP areas would have higher concentrations of dissolved solids due primarily to increased sediment load as shown in Impact No. 2 and Table VIII–4. Runoff from AMP areas would carry less sediment, and water quality would tend to improve. The change in surface water quality cannot be estimated from present data. Non-AMP areas exceed AMP areas by approximately 105,000 acres. The overall change in surface water quality would be a localized, long-term, adverse impact.

8. INCREASED GROUNDWATER WITHDRAWAL

Average annual groundwater withdrawal would reach 80 acre feet by the year 2000, an increase of 25 acre feet over existing withdrawals. Since the quantity of available groundwater and the rate of recharge are unknown, the effect of these withdrawals cannot be predicted at present. Increased ground cover on AMP areas would improve conditions that favor groundwater recharge, while deteriorating ground cover on non-AMP areas would have the opposite effect. This would be a localized, long-term, adverse impact.

Vegetation

Source of Impact: Continuation of Existing Grazing System

9. CHANGE IN FORAGE PRODUCTION

Vegetation would continue to improve on areas with AMPs and would decline on non-AMP areas. At present, the total range (public lands and private lands used in conjunction with public lands) in the Rio Puerco ES Area produces 69,446 AUMs of forage annually (compiled at 50 percent utilization of key forage species for grazing animals). Under the no action alternative, forage production would increase to 75,888 AUMs (computed at 50 percent utilization of key forage species). This is an increase on the 21 AMP allotments and a decline on the 75 non-AMP allotments. The result would be a net increase of 6,442 AUMs forage production annually by the year 2000.

Adverse impacts on vegetation would be limited to non-AMP areas. These impacts would result from the decrease in production, as well as lowered vigor, decreased ground cover, and a change in composition to less desirable species, as described in Chapter II, Future Environment Without the Proposed Action, Vegetation Section. Preferred species and favorite grazing locations would receive heavy, continuous, grazing pressure and would be the most severely impacted. Plants resistant to grazing or unpalatable to livestock would increase.

Responses by poisonous and endangered and/or threatened plants would be similar to those discussed in Chapter II, Future Environment Without the Proposed Action.

The overall effect of the no action alternative would be increased forage production: an area-wide, long-term, beneficial impact on AMP allotments. The effect on non-AMP allotments would be an area-wide, long-term, adverse impact.

Wildlife

The direction and extent of wildlife population changes are based upon the species' habitat requirements and their ability to adapt to or resist environmental change.

Conditions expected to influence wildlife populations in the Rio Puerco ES Area are:

(1) habitat improvements resulting from special wildlife projects developed in Habitat Management Plans (HMPs) and the 21 Allotment Management Plans (AMPs) already implemented;

(2) habitat declines resulting from deterioration of vegetative resources on areas without AMPs, energy and mineral develop, increased recreational use and development, and expanded demands on the land from increasing human populations in the area; and

(3) poaching and other conditions that destroy wildlife directly. Poaching is already a serious problem in the area and is extremely difficult to control. With expanding human populations, this problem would probably become more intense.

Source of Impact: Construction and Physical Presence of Range Improvements

10. EXTENSION OF AQUATIC HABITAT

Range improvements such as wells, stock tanks, pipelines, and other water developments which fulfill critical wildlife needs, would increase wildlife numbers and distribution. These improvements would be made on allotments under AMPs. Construction of such projects on areas not under AMPs would be restricted to those authorized under Section 4 permits and cooperative agreements. This would be a localized, long-term, beneficial impact.

Source of Impact: Continuation of Existing Grazing System

11. REDUCTION OF BIG GAME HABITAT

Habitat changes due to heavy livestock use and/or joint big game and livestock use would occur on non-AMP areas. Deer winter range would suffer a 20 percent decrease of areas in fair condition and a 10 percent loss of those in good condition. Fair elk range would be reduced by 15 percent and good elk range would be reduced 10 percent. Fair yearlong antelope range would decrease by 20 percent and good antelope range would be reduced by 10 percent.

Big game populations would decline throughout most of their range in the ES Area as a result of habitat reductions and increased competition between big game and livestock for available forage. Elk winter use in the La Ventana area probably would not change; however, both summer and winter use on the Ignacio Chavez Grant would decline. Deer populations (seasonal as well as permanent) would decline in all areas except La Ventana and the Continental Divide. Antelope populations would also decline in the areas of their range not covered by AMPs and would be prevented from expanding into new potential range. The overall effect by the year 2000 would be a habitat reduction of 15 elk, 25 deer, and 35 antelope. Black bear would discontinue use of the area due to loss of habitat, and mountain lions would also disappear as the area's deer herds are reduced (estimates by BLM District Wildlife Biologist). This would be a localized, long-term, adverse impact.

12. REDUCTION OF GAME BIRD HABITAT

Game birds would also suffer population reductions, although overall effects would be less drastic than those encountered by big game species. Among game birds of the area, turkeys are in greatest danger of serious population reduction. Their habitat is already marginal because of poor nesting and brooding sites and the lack of permanent water. If habitat continues to decline, the existing flock of 50 to 75 birds may dwindle to less than 25 or disappear entirely. Scaled quail also occupy a declining marginal habitat, and their numbers would be reduced in the ES Area. Mourning doves adapt more readily to environmental change and are capable of traveling great distances for food and water; however, anticipated declines in vegetation and overall seed production on non-AMP allotments would reduce available food and cover on approximately 64 percent of the ES Area. This would reduce the total number of birds using the area a minimum of 10 percent (estimates by BLM Albuquerque District Wildlife Biologist). This would be a localized, long-term, adverse impact.

13. CHANGE IN FURBEARER POPULATIONS

Three furbearers, the badger, kit fox, and gray fox, would probably expand in numbers as a result of increased rodent populations. While the extent of expansion of these species is dependent upon the degree of competition with coyotes, existing numbers are expected to increase at least ten percent. The populations of the remaining furbearers of the area, raccoons, ring-tailed cats, and skunks, would probably remain stable or decline. This would be an area-wide, long-term, beneficial impact.

14. IMPROVED WILDLIFE HABITAT

Range conditions would improve on the 21 allotments covered by AMPs. These improvements would increase wildlife habitat for many of the area's wildlife species. In addition, rested portions of these allotments available only to wildlife would further increase food and cover for such species as deer, elk, tree squirrels, rabbits, and many song birds. Rested areas would also provide additional nesting sites, perches, and dens for raptors and predatory mammals. The final results on the 21 allotments covered by AMPs would be an increase in wildlife numbers as well as species diversity (estimate by BLM Albuquerque District Wildlife Biologist). This improvement would be a localized, long-term, beneficial impact.

Cultural Resources

Source of Impact: Continuation of Existing Grazing System

15. INCREASED SOIL EROSION

The potential impacts on cultural resources under this alternative are expected to derive largely from the effects of erosion. The analysis of impacts on soils indicates that this alternative would increase the rate of erosion on non-AMP allotments. The deterioration of cultural resource sites would be a localized, long-term, adverse impact.

Source of Impacts: Construction and Physical Presence of Range Improvement Projects

Range Improvements

16. DISTURBANCE

Cultural resource values are most directly threatened by disturbance from range improvement construction. For this reason, the BLM includes as part of construction activities, procedures to avoid inadvertent adverse impacts on cultural resources. These procedures are described in Chapter I and would be the same for all project construction projects built under this alternative.

Construction of range improvements could adversely impact cultural resources directly through destruction as well as indirectly through vertical and horizontal displacement. There may also be contamination of an area's religious and heritage values through installation of inappropriate structures. Some properties with heritage and religious values could be destroyed. Construction in areas which have high-density cultural resources may result in contamination of religious and heritage values as well as loss of cultural sites after scientific knowledge is gained through studies conducted prior to destruction. This localized, adverse impact would be long-term.

Paleontology

Source of Impact: Construction and Physical Presence of Range Improvements

17. DISTURBANCE OF MORRISON FORMATION

In general, the paleontological resources of the ES Area would not be significantly impacted by implementation of this alternative. Construction of proposed improvement projects on implemented AMP allotments where the Morrison Formation is exposed (Christianson and Macario Maestas allotments) may encounter a fossil bone deposit. See Map II-1 for location of Morrison Formation in the ES Area. The probability of disturbing bone deposits cannot be predicted with present data. Any disturbance of fossils would be a localized, long-term impact.

Visual Resources

Source of Impact: Continuation of Existing Grazing System

18. CONTRAST-GRAZING SYSTEMS

Adverse visual impacts on non-AMP allotments would be potentially greater because vegetative reductions on these lands would cause visual contrast along fence lines greater than those that now exist. Soil disturbance and vegetative declines due to continued use would cause more intensive vegetative contrasts between AMP and non-AMP allotments. This would be an adverse, area-wide, long-term impact.

Source of Impact: Construction and Physical Presence of Range Improvements

19. CONTRAST-RANGE IMPROVEMENTS

Visual impacts resulting from projects on areas with AMPs would be similar to those of the proposed action; however, there would be fewer projects in the area as a whole because few BLM range improvements would be constructed on non-AMP allotments. (See introduction of this alternative for list of anticipated range improvements). Two catchments and .9 miles of fence would not meet Class II objectives. Approximately ten percent of the troughs and wells would not meet Class II objectives. This would be a localized, long-term, adverse impact.

Recreation

Source of Impact: Continuation of Existing Grazing System

20. ALTERED RECREATION QUALITY AND USE

Continuation of the present level of management on non-AMP areas would result in deterioration of existing recreational resources and would limit future recreational options. Nearly all types of recreation would be affected by this alternative. Vegetative decline would lower the area's aesthetic qualities and would decrease opportunities for recreational sightseeing, hiking, and camping. Erosion of fragile soils would limit ORV use. Reductions in diversity and numbers of wildlife would limit the occurrence and quality of experiences gained through recreational hunting and nonconsumptive forms of wildlife recreation. This decreased quality would be a localized, long-term, adverse impact.

Although the quality of the recreation experience is expected to decline, the number of visitor days of use is expected to increase. Recreation use levels (visitor days) under this alternative through the year 2000 is shown in Table VIII-6.

Table VIII-6
Anticipated Recreation Use Levels
No Action
Year 2000

	Visitor Use Days
ORV Use	191,000
Sightseeing	433,000
Primitive/Natural Area Use	7,000
Hunting	62,000

Data, based on impacts of this alternative, present recreational use levels and recreational use demand projections through the year 2000, using the 1976 Statewide Comprehensive Outdoor Recreation Plan—SCORP (compiled by N.M. State Planning Office) as a guideline.

Livestock Grazing

Source of Impact: Continuation of Existing Grazing System

21. INITIAL REDUCTION OF AUMs

As in the proposed action, there would be initial adjustments in the authorized stocking rates to balance forage use with forage available in accordance with the 1975 BLM Resource Inventory. A total of 50,955 AUMs on public lands would be available in the ES Area (both AMPs and non-AMPs). This is an initial overall reduction of 1,615 AUMs from the 1975-76 active licensed use or 6,154 AUMs from the 57,109 current active AUMs available for use. The 6,154 AUMs would be held in suspended non-use until forage conditions improved. The initial AUM reduction is the overall result of both increases and decreases for specific allotments. (See Table II-45, Future Environment, for initial reduction by allotment.) This would be an area-wide, short-term, adverse impact.

22. INCREASED AUMs ON AMP AREAS

By the year 2000, AUM allocations for areas with AMPs would increase by 14,664, due to anticipated increases in forage production. This anticipated increase is listed on Table VIII-7. This is a localized, long-term, beneficial impact.

23. DECREASED AUMs ON NON-AMP AREAS

The San Luis Watershed Study (see Appendix I-2) and Table II-45 provides data which indicates that areas not under AMPs would decline in forage production. Such declines would bring about an adjustment in stocking rates relative to the reduced forage availability. It is anticipated that by 2000 AUMs on non-AMP areas would be reduced by 14,262. This anticipated decrease is shown on Table VIII-7. The reduction would be a localized, long-term, adverse impact.

Forestry

Source of Impact: Continuation of Existing Grazing System

24. RUBBING AND TRAMPLING

Forestry resources on the El Banquito allotment would continue to decline in quality and quantity under the no action alternative. Areas having livestock concentrations where there are sapling trees would be subject to damage. Trampling in these areas would also result in damaged seedlings and soil disturbance which would retard growth of seedlings. However, trampling would also bury seeds and make them more likely to germinate. Overall there would be a localized, long-term, adverse impact.

25. REDUCED COVER AND LITTER

Favorable levels of soil temperature for pine seedling development and regeneration would not be available due to lack of protective vegetative cover and litter on non-AMP allotments. Conditions of high soil temperature in summer and frost-heave during winter months would be more prevalent in this situation and would increase seedling mortality. Areas having implemented AMPs would also have some of these impacts in the use pasture, but to a much lesser degree. Overall there would be a localized, long-term, adverse impact.

Socio-Economics

Source of Impact: Continuation of Existing Grazing System

26. DECLINE IN RANCH OPERATIONS

Under the no action alternative, the number of ranches in the ES Area would decline from 134 to 119. This reduction would occur among non-AMP

Table VIII-7

LIVESTOCK AUMs AVAILABLE ON PUBLIC LANDS FOR ALLOTMENTS WITH AND WITHOUT AMPs

No Action Alternative

	Allotments With AMPs	Allotments Without AMPs	Total
1975 Grazing Privileges Available for Active Use (AUMs)	20,862	36,247	57,109
Forage Available for Livestock, 2000 (AUMs)	35,526	21,985	57,511
Change from 1975 to 2000 (AUMs)	+14,664	-14,262	+402

Source: AMP Files for Proposed Action, Tables II-35, II-36, II-45 and III-15 allotments and would result from AUM reductions due to declining range conditions. Areas with AMPs would continue to show range improvements and would expand. Ranch sizes in the ES Area are estimated to change as follows: Subsistence ranches would increase from 84 to 89; small ranches would decline from 42 to 20; the number of medium ranches (eight) would not change; and two ranches would become large (based on change in projected AUMs at the year 2000, Table II-45, and the projection that fifteen ranches would go out of business). This would be a localized, long-term, adverse impact.

27. Increased Returns

A summary of ranch receipts, costs and returns for the no action alternative are listed on Table VIII-8. The net effect from calf sales would be an increase of $1,162,799 This increase would result from increases in livestock prices by the year 2000. As noted in the Livestock Grazing section, overall change in AUMs at the year 2000 would be an increase of 402 AUMs, which only amounts to actual returns of an additional 12,316 from calf sales. The increase in returns would be an area-wide, long-term, beneficial impact.

28. Reductions in Employment

Reductions in ranch operations would affect employment in the ranch sector. Under this alternative, employment in the ranch industry would decline by eleven (Gray, 1976). This would be an area-wide, long-term, adverse impact.

29. Recreation

Data in the recreation impact section (no action alternative) indicates the following changes:

(1) ORV visitor use days from 170,000 to 191,000;
(2) sightseeing visitor use days from 324,000 to 433,000;
(3) primitive/natural area visitor use days from 4,000 to 7,000; and
(4) hunter days from 46,000 to 62,000.

Using the following range of values, the impact on recreation by 2000 for the no action alternative would be an increase of $732,000 to $1,282,000: ORV ($4 to $6 per visitor use day), sightseeing ($4 to $6 per visitor use day), primitive/natural areas ($4 to $6 per visitor use day), deer ($11 to $25 per visitor use day), elk ($20 to $65 per visitor use day), small game ($11 to $20 per visitor use day), and upland game ($8 to $15 per visitor use day). The range of values used is that provided for conducting economic analysis of AMPs. This would be an area-wide, long-term, beneficial impact.

Mitigating Measures

The measures analyzed in this section are actions that would reduce or eliminate adverse impacts identified in the impact analysis of the no action alternative. Each measure is analyzed in relation to a specific component of the proposed action. All measures are considered feasible under existing technology and would be required if the alternative is approved.

Table VIII-9 has three columns used to display mitigating measures. The first column identifies the impact. The second column is the mitigation measure to be applied. The third column is a measure of how much the mitigation measure would reduce the impact. The numbers which appear in the three columns in Table VIII-9 are the same numbers which appear in the analysis of impacts under the alternative. These numbers can be used as a guide to the reader through Impacts, Mitigating Measures, and Adverse Impacts That Cannot Be Avoided.

Mitigating Measures are only shown for Water Resources, Wildlife, Cultural Resources, Paleontology and Visual Resources. Because they would receive no adverse impacts, no mitigating measures are shown for Climate, Geologic Setting, Topography, Mineral Resources and Transportation Networks. Adverse impacts on Soils, Vegetation, Recreation, Livestock Grazing, Forestry and Socio-Economics could not be mitigated. Unavoidable adverse impacts are analyzed for Soils, Vegetation, Wildlife, Visual Resources, Recreation, Livestock Grazing and Forestry. Only major adverse impacts are analyzed as unavoidable.

Adverse Impacts That Cannot Be Avoided

This section presents an analysis of the unavoidable adverse impacts which would result from implementation of the alternative. These impacts are those unavoidable adverse impacts which could not be mitigated.

No unavoidable adverse impacts are analyzed for Climate, Geologic Setting, Topography, Mineral Resources, Transportation Networks and Socio-Economics. (Only major adverse impacts

Table VIII-8

SUMMARY OF RECEIPTS, COSTS, RETURNS PER RANCH
NO ACTION ALTERNATIVE
RIO PUERCO ES AREA
(Year 2000)

Item	Subsistence Ranch	Small Ranch	Medium-sized Ranch	Rio Puerco ES Area
	....	........(dollars)	....	....
Receipts:				
Calves	7,064	20,485	70,728	1,058,599
Steers and heifers	476	3,913	13,952	161,013
Cows and bulls	157	3,371	5,042	93,235
Crops and others	0	0	0	0
Total	7,697	27,769	89,722	1,312,847
Costs:				
Feed	525	3,127	8,032	121,123
Leases and grazing fees[a]	585	2,136	6,230	75,825
Other livestock expense	446	2,651	8,229	109,431
Machinery	1,607	4,240	7,786	193,942
Improvements	388	2,625	3,093	81,839
Property taxes	103	771	1,440	22,786
Hired labor	113	793	4,280	40,306
Other	348	2,246	5,720	85,325
Total	4,115	18,589	44,810	730,577
Return to Operator and Area for Labor, Management, and Capital	3,582	9,180	44,912	582,270

[a] Leasing and grazing fees estimated at 42% increase by year 2000

Source: English and Gray, Socio-Economic Impacts of Proposed Action and Alternatives in the Rio Puerco Allotments, 1976

Table VIII-9

MITIGATING MEASURES
NO ACTION ALTERNATIVE

Impacts	Mitigating Measures	Reduction Due To Mitigation
WATER RESOURCES		
5. Increased peak runoff.	5, 6. Enlarge dam storage capacity and design spillways on water retention structures which would reduce the adverse impacts of increased runoff, dam failure and sedimentation.	5, 6. There would be a reduction in effects from runoff and dam failure. The magnitude cannot be quantified due to lack of data.
6. Increased potential for dam failure.		
WILDLIFE		
11. Reduction of big game habitat.	11. Change seasons of livestock use and reduce livestock numbers.	11. There would be a reduction in the rate of decline in big game carrying capacity.
12. Reduction of game bird habitat.	12. Provide additional wildlife exclosures and wildlife preserves.	12. The reduction in the effect on game birds would be approximately 10%.
CULTURAL RESOURCES		
16. Disturbance	16. Inventory and if necessary excavate archeological site at locations where it is necessary to construct projects. Limit the construction in the Casa Salazar and Guadalupe areas.	16. Limiting construction would avoid the impacts identified.
PALEONTOLOGY		
17. Disturbance of Morrison Formation	17. In future construction of range improvements on the Morrison Formation, surface disturbance activities would be examined by a qualified specialist. If paleontological material is discovered during construction, the work would be modified or stopped pending further authorization by the BLM District Manager.	17. With proper examination and care during construction any paleontological resource discovered would be saved.
VISUAL RESOURCES		
19. Contrast (Range Improvements)	19. Fences would be placed where natural vegetation and land forms can hide them from viewpoints. Long fenceline tangents would be avoided and lay as close as possible to natural contours. Fence posts surrounding spring developments would be painted green or gray. The fences around catchments in wooded areas would include some trees. Storage tanks, troughs and well sites would be located in areas of least susceptible erosion problems. Where possible, storage tanks, troughs and well sites would be screened by natural land forms and/or vegetation.	19. Highest VRM Class objective expected to be met before mitigation is Class III. After mitigation, the highest VRM Class objective which could be met is Class II. Highest VRM Class objective expected to be met before mitigation is Class III. Application of the mitigation measure would not be enough to change the VRM Class but would reduce the contrast.

Source: Compiled by BLM Resource Specialist are analyzed as unavoidable.) Numbers preceding impacts are the same numbers used to identify impacts.

Air Quality

1. INCREASED DUST

There would be an increase in dust from allotments without AMPs. This increase cannot be quantified.

Soils

2, 3. INCREASED SEDIMENT YIELD, EXPANDED CRITICAL EROSION AREAS

On areas without AMPs (249,218 acres), there would be increased sediment yield by as much as 510 tons per square mile per year in the Billings-Persayo Soil Association (Table VIII-4). Critical erosion areas would expand from 34,254 acres to 59,678 acres on non-AMP allotments. This would result from decreased vegetative cover, surface disturbance of soil around water tanks and salting areas.

Water Resources

5,6. INCREASED PEAK RUNOFF, INCREASED POTENTIAL FOR DAM FAILURE

Peak runoff from non-AMP areas would increase erosion and sediment load on the four soil associations identified on Table VIII-5. Quality of the surface runoff would also be degraded because of the increased sediment and its soluble salts content. The magnitude of increased peak runoff varies from 0 to 29 percent with the greatest increase occuring on the Litle-Las Lucas and Billings-Persayo Soil Associations.

Impacts resulting from increased peak runoff and increased potential for dam failure would be reduced somewhat by the mitigating measures specified on Table VIII-9. The magnitude of such reduction in impacts cannot be determined from available data. However, it is concluded that the overall effect of the mitigating measures would be minimal and there would be an unavoidable adverse impact on water resources.

7. REDUCED WATER QUALITY

If the no action alternative is implemented, higher concentrations of dissolved solids would reduce quality of surface water. This impact would be unavoidable.

8. INCREASED GROUNDWATER WITHDRAWAL

Impacts resulting from increased groundwater withdrawal would be unavoidable. An additional 25 acre feet will be withdrawn from groundwater aquifers with a possibility of salt water intrusion from surrounding saline aquifers into fresh water.

Vegetation

9. CHANGE IN FORAGE PRODUCTION

Declines in forage production on areas without AMPs would be unavoidable. Vegetation would be severely impacted by heavy, continuous grazing with decrease in forage vegetation as shown on Table II-44 (e.g. Sagebrush—10 percent decrease, Greasewood and Shortgrass—8 percent decrease). Production of palatable plants would be reduced.

Wildlife

11. REDUCTION OF BIG GAME HABITAT

Deer, elk and antelope habitat would be reduced by as much as 20 percent. This impact on big game could not be avoided under this alternative as it would be related to the overall vegetative declines on non-AMP areas.

12. REDUCTION OF GAME BIRD HABITAT

Approximately 90 percent of the impacts on game bird habitat would remain after the mitigating measures are applied. The decline in habitat would result in an unavoidable decrease in game birds.

15, 16. INCREASED SOIL EROSION, DISTURBANCE

Cultural resources disturbed or destroyed by soil erosion or construction activities would sustain adverse impacts which could not be mitigated under the no action alternative.

17. DISTURBANCE OF MORRISON FORMATION

With precautions taken during range improvement construction, there would probably be very little destruction of paleontological resources in the Morrison Formation. This destruction would constitute an unavoidable, adverse impact.

Visual Resources

18. CONTRAST-GRAZING SYSTEM

Impacts on visual resources where intense vegetative fence line contrast between AMP and non-AMP allotments would be unavoidable under this alternative.

19. CONTRAST-RANGE IMPROVEMENTS

Impacts on visual resources from the construction of range improvements would be unavoidable under this alternative.

Recreation

20. ALTERED RECREATION QUALITY AND USE

Soil erosion and concurrent losses in vegetative cover on non-AMP allotments would cause unavoidable, adverse impacts on the quality of a recreational experience.

Livestock Grazing

21. INITIAL REDUCTION OF AUMS

The overall initial reduction of 6,154 AUMs from current active AUMs (57,109 AUMs) to conform with the 1975 BLM Resource Inventory would be unavoidable.

23. DECREASED AUMS ON NON-AMP ALLOTMENTS

The overall reduction of 14,262 AUMs on non-AMP areas by the year 2000 would be unavoidable.

Forestry

24, 25. RUBBING AND TRAMPLING, REDUCED COVER AND LITTER

A decline in forest resources as a result of ponderosa pine seedling mortality in the El Banquito allotment would be unavoidable.

No Grazing

Description

The no grazing alternative would result in the removal of all domestic livestock from public lands. Its implementation would entail the following:

1. Elimination of grazing licenses on public lands. No new AMPs would be developed, and those now implemented would be cancelled.
2. State and private land intermingled with public lands would have to be used in a way that avoided trespass on public lands. It is estimated that 320 miles of new fence on the boundaries of private and state lands would be needed to exclude livestock from public lands. Short-term disturbance from fence construction would occur on 320 acres while long-term disturbance would occur on 64 acres. Map VIII-1 shows where fences would probably be built.
3. No range improvements would be maintained or constructed unless necessary for other BLM programs (such as wildlife or watershed). Some range improvements such as existing fences which would serve no useful purpose and which create undesirable visual intrusions would be removed from the landscape.
4. The need for road easements would be the same as in the proposed action. Under the no grazing alternative, there would be no impacts on Climate, Geologic Setting, Topography, Paleontology, Mineral Resources, and Transportation Networks, and therefore these resources will not be discussed here. Table VIII-9 shows the environmental impacts of the no grazing alternative.

To aid in tracking, impacts have been numbered consecutively. Table VIII-10 summarizes these numbered impacts by resource. In addition, Table VIII-10 displays: (1) whether the impact is partially or totally mitigated by mitigating measures, (2) whether this impact (or part of the impact) is analyzed as an unavoidable adverse impact. Table VIII-11 summarizes the impacts by allotment. (Only major adverse impacts are analyzed as unavoidable.)

Impact Analysis

Air Quality

Source of Impact: Elimination of Grazing

1. SMOKE—WILDFIRES

Potential increases in wildfire due to the accumulation of old vegetative growth would cause adverse impacts on air quality. This impact would be short-term, following each fire, and localized. The propensity for larger wildfires would be long-term. Smoke would have a negligible impact on air quality.

Source of Impact: Prevention of Trespass

2. INCREASED DUST—FENCE CONSTRUCTION

The elimination of livestock grazing licenses on public lands would cause livestock operators to construct 320 miles of new fences to contain their livestock on state and private lands in order to prevent trespass (see Map VIII-1). This fence construction would cause a localized, short-term increase in dust on 320 acres. Sixty-four acres would be in use long-term.

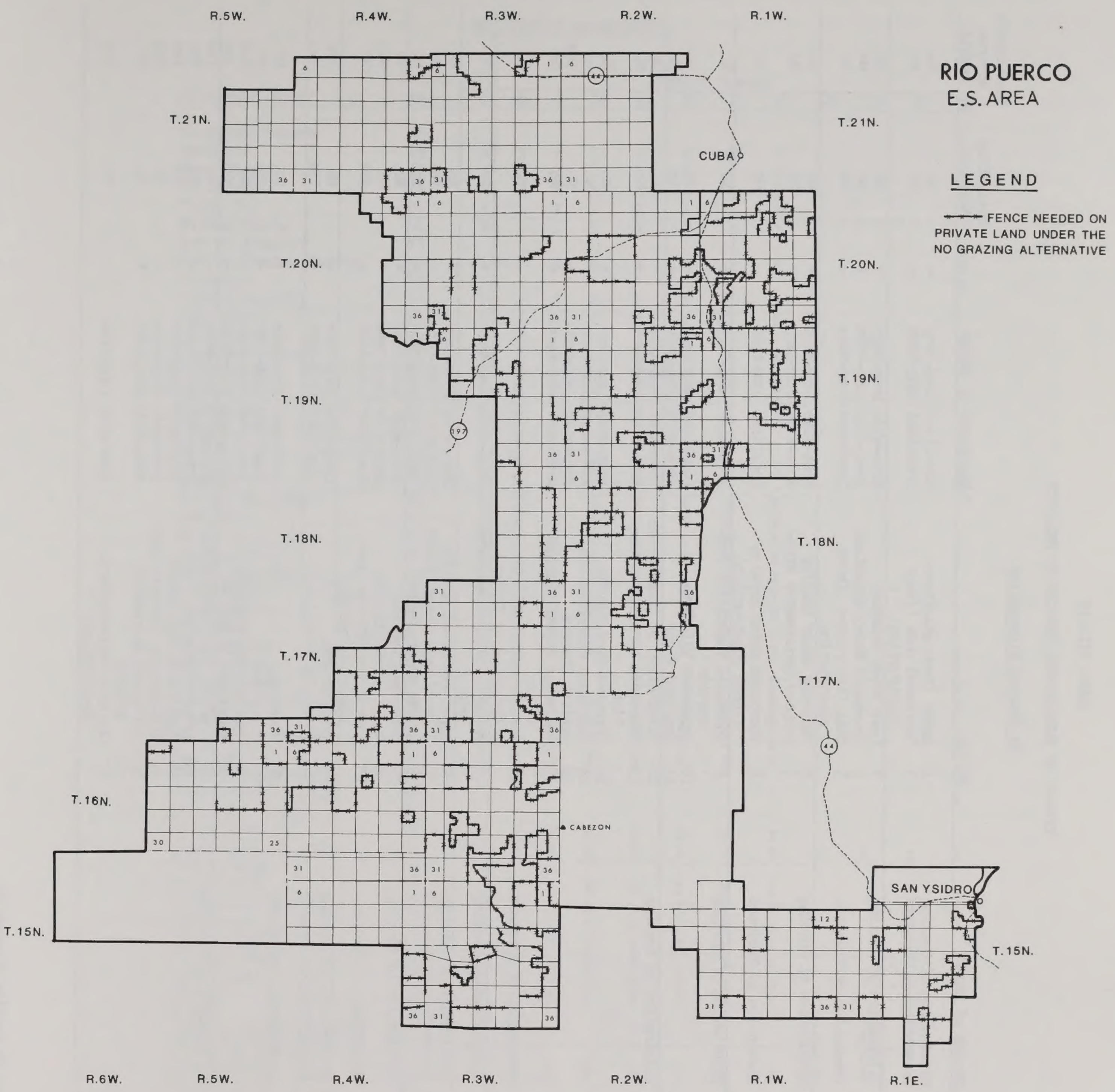
Soils

Source of Impacts: Elimination of Grazing

3. LESS WATER EROSION

With the removal of domestic livestock grazing from public lands, relief from grazing pressure would result in increased vegetative cover for a period of about ten years (San Luis Watershed Study, 1972; see Appendix I-2). During this time, litter on the soil surface would also increase, improving soil tilth and moisture retention and reducing disturbance of the soil by rainfall.

By the year 2000, however, it is estimated that vegetative cover would be less than the potential



NO GRAZING ALTERNATIVE

FENCES NEEDED TO PREVENT TRESPASS

SOURCE: BLM DISTRICT FILE

MAP VIII-1

Table VIII-10

SUMMARY OF ANTICIPATED IMPACTS BY RESOURCE

No Grazing Alternative

Resource	Source of Impact	Impact		Magnitude of Impact		Mitigating Measures	Unavoidable Adverse Impacts
Air Quality	Elimination of Grazing	1	Smoke (from wildfires)	Localized long-term	-	No	No
	Prevention of Trespass	2	Increased Dust (fence construction)	Localized long-term	-	No	No
Soils	Elimination of Grazing	3	Less Water Erosion	Area-wide long-term	+	No	No
		4	Increased Water Retention	Area-wide long-term	+	No	No
	Prevention of Trespass	5	Soil Disturbance (fence construction)	Localized long-term	-	No	No
Water Resources	Elimination of Grazing	6	Improved Water Quality	Area-wide long-term	+	No	No
		7	Reduced Groundwater Withdrawal	Area-wide long-term	+	No	No
	Prevention of Trespass	8	Increased Water Erosion (fence construction)	Localized long-term	-	No	No
Vegetation	Elimination of Grazing	9	Increased Vegetative Production	Area-wide long-term	+	No	No
		10	Increased Wildfires	Localized long-term	-	No	Yes
		11	Improved Vigor	Area-wide long-term	+	No	No
Wildlife	Elimination of Grazing	12	Elimination of Competition	Area-wide long-term	+	No	No
		13	Increased Forage Reservation	Area-wide long-term	+	No	No
		14	Improved Bird Habitat	Area-wide long-term	+	No	No
		15	Increased Waterfowl Use	Area-wide long-term	+	No	No
		16	Habitat Changes	Area-wide long-term	±	No	Yes
		17	Increased Coyote Populations	Area-wide long-term	±	No	No
	Prevention of Trespass	18	Restricted Antelope Movement (presence of fences)	Area-wide long-term	-	Yes	No
Cultural Resources	Elimination of Grazing	19	Reduced Cultural Resource loss	Area-wide long-term	+	No	No
Visual Resources	Elimination of Grazing	20	Improved Visual Quality	Area-wide long-term	+	No	No
	Prevention of Trespass	21	Loss of Open Space Values	Localized long-term	-	Yes	No
		22	Increased Contrast	Localized long-term	-	Yes	No
Recreation	Elimination of Grazing	23	Increased Hunting	Area-wide long-term	+	No	No
		24	Reduced Competition	Area-wide long-term	+	No	No
	Prevention of Trespass	25	Restricted ORV Use (presence of fencing)	Localized long-term	-	Yes	No
Livestock Grazing	Elimination of Grazing	26	Loss of AUMs	Area-wide long-term	-	No	Yes
	Elimination of Trespass	27	Fence Construction	Localized long-term	-	Yes	No
Forestry	Elimination of Grazing	28	Rubbing	Localized long-term	+	No	No
		29	Trampling	Localized long-term	-	No	No
		30	Vegetative Competition	Localized long-term	-	No	Yes
		31	Increased Wildfires	Area-wide long-term	-	No	Yes
Socio-Economics	Elimination of Grazing	32	Loss of Ranch Operations	Area-wide long-term	-	No	Yes
		33	Loss of Receipts	Area-wide long-term	-	No	Yes
		34	Decline in Employment	Area-wide long-term	-	No	Yes
		35	Non-Grazing Economic Loss	Area-wide long-term	-	No	Yes
		36	Increased Recreation Returns	Area-wide long-term	+	No	No
		37	Altered Socio-Cultural Expectations	Area-wide long-term	-	No	Yes

+ Positive Impact
- Negative Impact

Source: Summarization of No Grazing Alternative

Table VIII-11

SUMMARY OF IMPACTS BY ALLOTMENT

No Grazing Alternative

Allotment Name	Allot. No.	Impact Number											
		2	5	8	18	21	22	25	27	28	29	30	32
Corrales Tierra	55												X
Senorito	19	X	X	X	X	X	X	X	X				
Mesa Portales	17	X	X	X	X	X	X	X	X				
Nacimiento	14	X	X	X	X	X	X	X	X				
Ridge Top	24	X	X	X	X	X	X	X	X				
Salado-Tapia	51	X	X	X	X	X	X	X	X				
Arroyo Alamito	45												X
Arroyo Piedra Parada	54	X	X	X	X	X	X	X	X				X
Cachulie	39												X
Cebo Community	33	X	X	X	X	X	X	X	X				
Coal Creek	29	X	X	X	X	X	X	X	X				
El Banquito	49									X	X	X	X
Fork Rock Mesa	16	X	X	X	X	X	X	X	X				
Forty-four	18	X	X	X	X	X	X	X	X				
Gypsum Hill	61	X	X	X	X	X	X	X	X				X
Lagunitas	12	X	X	X	X	X	X	X	X				
Ojo de los Pinos	8									X	X	X	
Pelon	3												X
San Pablo	20	X	X	X	X	X	X	X	X				
Shroyer	2												X
Arroyo Empedrado	36	X	X	X	X	X	X	X	X				
Azabache	42	X	X	X	X	X	X	X	X				
Banco de la Casa	52	X	X	X	X	X	X	X	X				X
Cabezon Peak	44	X	X	X	X	X	X	X	X				X
Canon del Camino	53	X	X	X	X	X	X	X	X				
Cerro Cuate	41	X	X	X	X	X	X	X	X				
Cucho Arroyo	57	X	X	X	X	X	X	X	X				
Dry Well	27	X	X	X	X	X	X	X	X				
Horn Arroyo	9	X	X	X	X	X	X	X	X				X
Lost Valley	40												X
Mesa Cortada	48												X
North San Luis Mesa	37	X	X	X	X	X	X	X	X				X
Pipeline	56	X	X	X	X	X	X	X	X				
Rio Salado Community	59	X	X	X	X	X	X	X	X				X
Rock House	60	X	X	X	X	X	X	X	X				
San Luis Community	38												X
San Ysidro Pasture	46												X
Valle San Isidro	15												
Chico Crossing	43	X	X	X	X	X	X	X	X				
Continental Divide	1	X	X	X	X	X	X	X	X	X	X	X	X
Dry Springs	5												
Eagle Mesa	23	X	X	X	X	X	X	X	X				
Guadalupe Community	47	X	X	X	X	X	X	X	X				X
Penistaja	11	X	X	X	X	X	X	X	X				
Piedra Lumbre	28	X	X	X	X	X	X	X	X				
Torreon Wash	35	X	X	X	X	X	X	X	X				
Twin Butte	34	X	X	X	X	X	X	X	X				
Brandy	10	X	X	X	X	X	X	X	X				X
Starr	4									X	X	X	
Ignacio Chavez Grant	50									X	X	X	X
Chiuilla Community	7									X	X	X	X
Elk Springs	30	X	X	X	X	X	X	X	X	X	X	X	
Mighty Mite	58												X
Tres Hermanos	6												
Canada Candelaria	31	X	X	X	X	X	X	X	X				
Los Pinos Arroyo	26	X	X	X	X	X	X	X	X				
Cerro Colorados	32	X	X	X	X	X	X	X	X				
Bama	21	X	X	X	X	X	X	X	X				
Molino	13												X
Rock Ridge	25	X	X	X	X	X	X	X	X				
San Miguel	22	X	X	X	X	X	X	X	X				X

Impacts 1, 3, 4, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 23, 24, 26, 31, 33, 34, 35, 36 and 37 occur on every allotment.

Source: Summarized from the description of the No Grazing Alternative and Impacts.

under the proposed action. The weighted average vegetative cover would decrease approximately 22 percent, litter would be unchanged and total ground cover would be less than the proposed action. Data available from comparable areas in the Rio Puerco and Chaco Canyon supports these estimations (Dahl et al., 1976; also, see Vegetation, Impacts 9 and 11). Under these conditions, sediment yield would be similar to that of the proposed action. Table III-4 shows reduced soil losses ranging from 180 to 540 tons per square mile per year. This would be an improvement over what exists today and would be an area-wide, long-term, beneficial impact.

4. INCREASED WATER RETENTION

Anticipated vegetative production increases (see Vegetation, Impacts 9 and 11) would result in greater water retention in soils. This increased moisture availability is an element in the interchange between precipitation, soils, vegetation and animals which results in increased soil stability. Increased soil stability decreases wind and water erosion and is a beneficial, area-wide, long-term impact.

Source of Impact: Prevention of Trespass

5. SOIL DISTURBANCE—FENCE CONSTRUCTION

Short-term soil erosion losses by wind and overland flow of water would occur on approximately 320 acres disturbed by the 320 miles of fence construction on private and state lands. Long-term soil erosion losses would occur on 64 acres after revegetation and would affect public lands. This would be an adverse localized, long-term impact.

Water Resources

Source of Impact: Elimination of Grazing

6. IMPROVED WATER QUALITY

Sediment yields under the no grazing alternative would be similar to those expected from the proposed action (Soils Table III-4). Water quality would improve and turbidity of surface waters would decrease as in the proposed action. Again, this change cannot be quantified, but it is not expected to be great. Overall, no grazing would have an area-wide, long-term, beneficial impact on water quality.

7. REDUCED GROUNDWATER WITHDRAWAL

Groundwater withdrawals would be reduced to about 35 acre-feet per year. The effect on groundwater levels or quality cannot be quantified with our present knowledge of the area. However, reduced pumping combined along with surface conditions which are more favorable to groundwater recharge would tend to increase the total supply of groundwater. Reduced groundwater withdrawal would be an area-wide, long-term, beneficial impact.

Source of Impact: Prevention of Trespass

8. INCREASED WATER EROSION

Construction of 320 miles of fence would result in small short-term increases in sedimentation on 320 acres of disturbed area. The long-term impact would be increased sedimentation on 64 acres. Overall, this increased water erosion would be a localized, long-term, adverse impact, which would be negligible.

Vegetation

Source of Impacts: Elimination of Grazing

9. INCREASED VEGETATIVE PRODUCTION

Vegetative composition and production would increase for a period of about ten years under this alternative and then would decline and stabilize. (San Luis Watershed Study, 1972; see Appendix I-2). Data available on comparable vegetative subtypes and range sites (in the Rio Puerco and Chaco Canyon National Monument areas) supports this conclusion. In this study, it was found that the weighted average total vegetative ground cover decreased on ungrazed areas in the long-term by approximately 22 percent and litter remained unchanged, while bare ground increased fifteen percent. Reardon and Merrill (1976) found that forage yields and litter accumulations were lower on natural areas than under deferred rotation and light grazing at the end of 20 years. Comparison of ground cover changes in the San Luis watershed for deferred grazing pastures and a total non-use pasture showed the ungrazed pasture had 24 percent less total vegetative ground cover than the grazed pasture. Applying the 22 percent difference from the predicted production in the proposal (Dahl et al., 1976), forage production in AUMs by the year 2000 would be 94,995 AUMs on public lands and all private and state lands used in conjunction with public lands (compiled at 50 percent utilization of key forage species for grazing animals). The increase in forage production would be an area-wide, long-term, beneficial impact.

10. INCREASED WILDFIRES

Potential increases in wildfire occurrence due to old vegetative growth would cause adverse impacts on vegetation. Wildfire would destroy standing dry vegetation, accumulated and potential litter and possibly live vegetative material in grass plant crowns. Live woody or shrub species could be destroyed, with a change in vegetative type and composition of species to the grassland type. Wildfires could occur in all vegetative types. There would be a localized loss of vegetation at the site prior to initiation of standard fire suppression activities. The impact of wildfire would be short-term for non-woody and long-term for woody vegetative types.

11. IMPROVED VIGOR

The removal of livestock from public lands would allow vegetation to gain vigor. As litter accumulates and the stimulus to plant growth (provided by moderate defoliation from grazing) is removed, vigor would again decline. (Dahl, et al., 1976; Weaver and Rowland, 1952). The final level of vigor would be improved beyond the present situation. The net effect would be an area-wide, long-term, beneficial impact on vegetation.

Wildlife

Source of Impact: Elimination of Grazing

12. ELIMINATION OF COMPETITION

Under the no grazing alternative, competition between wildlife and domestic livestock would be eliminated on public lands. Forage previously utilized by livestock would be available solely for wildlife, providing additional food and cover for the birds, mammals, reptiles, and amphibians of the area.

Disturbances of nests and dens by livestock and people would be reduced. Disease and parasite infections attributable to livestock carriers would be less prevalent. Competition for space would also be reduced. The limiting factors related to livestock grazing would no longer have a significant influence on wildlife populations. Elimination of competition would be an area-wide, long-term, beneficial impact on wildlife.

13. INCREASED FORAGE RESERVATIONS

Immediately following implementation of the no grazing alternative, removal of livestock would result in increases in food and cover equivalent to 50,955 AUMs. In addition, wildlife would benefit from improvement in vegetative composition and production, and would respond by expanding their populations. Within the first five to ten years after the alternative is implemented, these expansions would be more rapid than what would be expected under the proposed action. However, based on the data provided by Dahl, et al., (1976), vegetative production and ground cover by the year 2000 would be somewhat lower than anticipated under the proposal. This would influence carrying capacities for most wildlife species of the area and would result in populations somewhat lower than under the proposal. However, wildlife habitat would be improved over what exists today.

Available data on deer/cattle relationships (Julander, 1953; Thelenus and Hungerford, 1967; McKean and Bartmann, 1972; and Dusek, 1975) suggests that when both species are stocked with the supporting capacity of their favored forage, no direct competition exists. Dusek found no significant competition between mule deer and cattle (no grazing system) in Northwestern Colorado. Thelenus and Hungerford concluded that dual use (five months summer use vs. no livestock use) may be more efficient. Julander stated that 'more wild land values can be produced on most ranges by grazing both deer and livestock, in proper numbers, than by grazing either alone'. Allen (1974) concluded: 'Properly adjusted uses may actually be complementary, since deer pressure on brush can have good effects on grass, and browsing by cattle on woody plants unpalatable to deer can help the growth of important deer foods'. If this is true, and if the predicted vegetative declines previously discussed are also true, deer herds of the area could have 10 to 20 percent less habitat than under the proposal.

Elk would also be affected by forage management changes. About 23,000 acres of summer and winter habitat on the Ignacio Chavez Grant (El Banquito and Ignacio Chavez allotments) and 6,000 acres of winter habitat in the La Ventana area (Los Pinos Arroyo and San Pablo allotments) would be relieved of grazing use by 5,008 livestock AUMs. The forage allotted to livestock under the proposal would, therefore, be available to wildlife. While elk populations would continue to be limited by the quality of winter browse, additional grasses and forbs would be available for summer use by the resident elk herd on Ignacio Chavez Grant. Increases in this herd would place additional stress on the winter habitat on the area.

It is assumed, however, that New Mexico Department of Game and Fish would apply appropriate population regulating mechanisms to prevent overstocking of winter ranges by deer and elk, and that overall winter elk use by the year 2000 would be equivalent to the proposal.

To the degree that their feeding habits overlap, the forage not consumed by livestock would be available for antelope. The removal of cattle would, therefore, be beneficial to antelope to the extent that food and nutrition is limiting. Populations would continue to be limited by other factors, such as water shortages and the invasion of woodlands into their habitat. Based on estimates of additional forage availability, the degree of (cattle/antelope) dietary overlap, habitat changes resulting from the alternative and additional stress resulting from fencing, the alternative would result in habitat for approximately 190 antelope. The increased forage would be an area-wide, long-term, beneficial impact.

14. IMPROVED BIRD HABITAT

Following the removal of livestock, habitat conditions for the three upland game bird species would improve within a short period of time. This would result in larger, more healthy populations. The disturbance of nests and patches of cover by livestock and livestock operators would no longer occur; however, such disturbances also increase edge, and total edge would be reduced. Seedheads of grasses and forbs would be allowed to develop without livestock disturbance, and additional food would be available. Because competition between livestock and turkeys would be minimal under the proposed action, turkey populations under this alternative would be similar to the proposal. However, quail normally achieve their highest potential under moderately disturbed situations. Less edge would be provided under this alternative and quail habitat would be slightly lower than under the proposal. Mourning dove use of the area would increase as a result of increases in available food and nesting sites. The total number of doves using the area and frequency of use by individual birds would be greater under the alternative than what would be expected under the proposal. Water would continue to be limiting for all species, but would have less influence on dove use because of their mobility. The overall effect would be an area-wide, long-term, beneficial impact.

15. INCREASED WATERFOWL USE

The anticipated reduction in livestock would relieve competition for existing water sources and would improve water quality in the existing tanks and reservoirs normally used by livestock. This reduction in competition is expected to double the use of the area by waterfowl and shorebirds. Although additional water developments would not be built, increased waterfowl use would be an area-wide, long-term, beneficial impact.

16. HABITAT CHANGES

Elimination of livestock use would result in increased growth of trees (e.g., pinyon-juniper, tamarisk, Russian olive), and shrubs (e.g., sagebrush and greasewood). This would have a beneficial impact on tree dwelling birds, rabbits, rodents (in general), tree squirrels, and lizards. Grassland species (prairie dogs, burrowing owls, meadowlarks, and horned larks) would suffer habitat reductions. This area-wide, long-term impact is both beneficial and adverse.

17. INCREASED COYOTE POPULATIONS

Predators such as bobcats, coyotes, badgers, and raptoral birds would benefit from increased rodent populations. Coyotes would receive additional beneficial impacts resulting from the elimination of demands for predator control to protect livestock on public lands. It is anticipated that coyote populations would respond by slightly increasing their numbers. This would be an area-wide, long-term, beneficial and adverse impact.

Source of Impact: Prevention of Trespass

18. RESTRICTED ANTELOPE MOVEMENT

The construction of 320 miles of new fence would restrict antelope movement and the population's ability to meet its habitat needs which would result in additional stress. This would be an area-wide, long-term, adverse impact.

Cultural Resources

Source of Impacts: Elimination of Grazing

19. REDUCED CULTURAL RESOURCE LOSS

The no grazing alternative is the least destructive of cultural resources and has the potential of making the greatest contribution to the preservation of cultural resources. No adverse impacts on cultural resources on public lands can be expected from this alternative because all fence construction would be on private lands. However, neither would there be gains in cultural resource information from inventory or salvage studies. Overall there would be an area-wide, long-term, beneficial impact on cultural resources.

Visual Resources

Source of Impacts: Elimination of Grazing

20. IMPROVED VISUAL QUALITY

Visual impacts from this alternative would be generally beneficial. Some range projects installed for grazing would be removed, and the sites previously occupied by these facilities would gradually improve and blend in with the undisturbed areas. Improved visual quality would be an area-wide, long-term, beneficial impact.

Source of Impact: Prevention of Trespass

21. LOSS OF OPEN SPACE VALUES

To control livestock, operators would probably fence their private and state leased lands. The 320 miles of fence that probably would be constructed would seriously detract from visual resources in the area. It is anticipated that the open space values common to much of the area now would be lost as private and state lands are fenced. Loss of open space values would be a localized, long-term, adverse impact.

22. INCREASED CONTRAST

A vegetative contrast would be evident in the elements of form, line, color, and texture where private and state grazing lands would be adjacent to nongrazed public lands. Although only 20 percent of the ES Area is in private and state ownership, the scattered nature of the state and private lands would result in patterns of heavy grazing adjacent to no grazing over the total area. Increased contrast would be a localized, long-term adverse impact.

Recreation

Anticipated changes in overall recreation use levels under the no grazing alternative are shown in Table VIII-12.

Table VIII-12
Anticipated Recreation Use Levels
No Grazing
Year 2000

Activity	Visitor Use Days
ORV use	176,000
Sightseeing	476,000
Primitive/Natural Area Use	9,000
Hunting	68,000

Data, based on impacts of the alternative, present recreational use levels and recreational use demand projections through year 2000, using the 1976 Statewide Comprehensive Outdoor Recreation Plan—SCORP (compiled by N.M. State Planning Office) as a guideline.

Source of Impact: Elimination of Grazing

23. INCREASED HUNTING

Within the first five to ten years following implementation of the alternative, wildlife populations are expected to expand at a more rapid rate than under the proposal (see Wildlife). This would increase the potential for hunter use and wildlife sightings. In the long-term, hunting opportunities would be slightly lower than the proposed action. However, potential hunting use would be higher than under existing conditions. Increased hunting would be an area-wide, long-term, beneficial impact. Potential hunter use under this alternative is shown on Table VIII-12.

24. REDUCED COMPETITION

Primitive area use and sightseeing use would increase as a result of elimination of competition with grazing interests with the ES Area. See Table VIII-12 for quantification of increase. Reduced competition would be an area-wide, long-term, beneficial impact.

Source of Impacts: Elimination of Grazing

25. RESTRICTED ORV USE—PRESENCE OF FENCING

To control livestock, operators would probably fence their private and state leased lands. This would result in less open space for ORV use and could hinder access to tracts of public lands adjacent to state and private lands. Anticipated ORV use under this alternative is shown on Table VIII-12. Restricted ORV use would be a localized, long-term, adverse impact.

Livestock Grazing

Source of Impact: Elimination of Grazing

26. Loss of AUMs

Under the no grazing alternative, all existing livestock use on public lands would be eliminated. No grazing licenses would be issued. Approximately 75 percent of the licensees in the area presently depend primarily on public (BLM-Forest Service) lands to continue their livestock business. Private lands presently owned by these licensees are generally not adequate to maintain their herds yearlong. With the loss of the right to graze public lands, these individuals would be forced to buy or lease other private or state grazing lands (to maintain their forest permits), or sell portions or all of their livestock. Several operators would ultimately be forced out of the livestock business. Refer to the Socio-Economic section for further discussion of this impact. The loss of AUMs would be an area-wide, long-term, adverse impact.

Source of Impacts: Prevention of Trespass

27. Fence Construction

Licensees with private and state lands intermingled with public lands would probably fence these areas off to prevent trespass on the public lands. Due to the high cost of fencing and reduction of grazing land available, the majority of livestock operators would also be forced to reduce their herd sizes substantially. Fence construction would be a localized, long-term, adverse impact on livestock grazing.

Forestry

Source of Impact: Elimination of Grazing

28. Rubbing

No grazing would eliminate current problems of rubbing on young timber stands presently caused by livestock on public lands. See Chapter III, Impact 103, for a discussion of current impacts from rubbing. The elimination of grazing would be a localized, long-term, beneficial impact.

29. Trampling

The beneficial aspect of trampling (burying seeds) would be eliminated under the no grazing alternative. This would be a localized, long-term, adverse impact on forestry.

30. Vegetative Competition

No grazing would increase vegetative competition to the point where establishment and survival of ponderosa pine seedlings may be critical. Since tree seedlings cannot compete as well with ungrazed plants, as with grazed plants, higher seedling mortality would be expected. Increased vegetative competition would be a localized, long-term, adverse impact on forestry.

31. Increased Wildfires

No grazing would create the environment for wildfires to start and spread more rapidly than at present. Because of this increased rate of spread, more forestry acreage would be consumed. During the past 9 years most of the 85 acres that burned were in the pinyon-juniper sub-type. This would create an area-wide, long-term, adverse impact.

Socio-Economics

Source of Impacts: Elimination of Grazing

32. Loss of Ranch Operations

Under the no grazing alternative, ranch operations in the ES Area would be confined to state and private lands. Due to the limited ability of these ranch operators to convert to a grazing system which excludes the use of public lands, it is estimated that approximately 38 of the existing ranch operations would go out of business. These would include thirteen ranches presently classified as subsistence, seventeen small and eight medium. Of the remaining 96 ranches, in business in the year 2000, 81 would be subsistence and fifteen small. None would be classified as medium.

The loss of BLM grazing privileges in the Rio Puerco ES Area would have little effect on the livestock industry statewide, but would drastically affect the individual operators of the area. This would be an area-wide, long-term, adverse impact.

33. Loss of Receipts

A summary of the estimated receipts, costs and returns to livestock operators as well as totals for the ES Area and socio-economic study area is provided on Table VIII-13. As indicated, this al-

Table VIII-13

SUMMARY RECEIPTS, COSTS AND RETURNS PER RANCH
NO GRAZING ALTERNATIVE
RIO PUERCO ES AREA AND SOCIO-ECONOMIC STUDY

Item	Subsistence Ranch	Small Ranch	Rio Puerco ES Area
	....	dollars	....
RECEIPTS:			
Calves	$8,383	$21,466	$293,811
Steers and Heifers	527	4,011	29,809
Cows and Bulls	162	3,236	17,696
Crops and Other	0	0	0
Total	$9,072	$28,713	$341,316
COSTS:			
Feed	577	3,011	26,756
Leases and Grazing Fees	429	1,372	16,201
Other Livestock Expense	490	2,553	22,704
Machinery	1,767	4,083	60,049
Improvements	427	2,528	21,077
Property Taxes	113	742	5,889
Hired Labor	124	764	6,284
Other	383	2,163	18,460
Total	$4,310	$17,216	$177,384
Return to Operator and Area for Labor, Management and Capital	$4,762	$11,497	$163,932

Source: Socio-Economic Impacts of Proposed Action and Alternatives in the Rio Puerco Allotment; Environmental Impact Report, English and Gray, NMSU, 1976.

ternative would result in total returns for the year 2000 of $163,932 in the ES area. These receipts would come from private and state lands. Because 50,955 livestock AUMs on public lands would be eliminated, there would be no receipts from the sale of calves on public lands. Loss of receipts would be an area-wide, long-term, adverse impact.

34. DECLINE IN EMPLOYMENT

Employment in the socio-economic study area related to ranching would decline by 36, and the total population in the ranching industry would be reduced by 107 (Gray and English, 1976). The decline in employment would be an area-wide, long-term, adverse impact.

35. NON-GRAZING ECONOMIC LOSS

Activity in other segments of the economy would continue to be influenced by factors not related to ranching: for example, the study area would continue to experience economic growth because of mineral development and because it adjoins the Albuquerque metropolitan area. However, the total influence on economic activity in the study area would result in an overall loss to the economy of $2,457,552 (English and Gray, 1976). This would be an area-wide, long-term, adverse impact.

36. INCREASED RECREATION RETURNS

The no grazing alternative would result in increased economic returns from recreation. Based on data provided (see Recreation), and using the range of values per day, provided under the economic analysis conducted in AMPs (ORV, $4 to $6; sightseeing, $4 to $6; primitive/natural areas, $4 to $6; deer hunting, $11 to $25; elk hunting, $20 to $65; small game, $11 to $20; and upland game $8 to $15), economic recreational returns would be an increase of $467,000 to $769,500 over existing returns. This would be an area-wide, long-term, beneficial impact.

37. ALTERED SOCIO-CULTURAL EXPECTATIONS

Based on informal conversations with a sample of land users in the ES Area (see Existing Environment, Chapter II), about 93 percent of the ranchers feel that their operations will continue and will expand. Under the no grazing alternative, these expectations would probably decline and attitudes would be altered. These altered expectations would be an area-wide, long-term, adverse impact.

Mitigating Measures

The measures analyzed in this section are actions that would reduce or eliminate adverse impacts identified in the analysis of the no grazing alternative. Each measure is analyzed in relation to a specific component of the alternative. All measures are considered feasible under existing technology and would be required if the alternative is approved.

Table VIII-14 has three columns used to display mitigating measures. The first column identifies the impact as it appears under impact analysis of the alternative. The second column is the mitigation measure to be applied. The third column is a measure of how much the mitigation measure would reduce the impact. The numbers which appear in the three columns in Table VIII-14 are the same numbers which appear in the impact analysis of the alternative. These numbers can be used as a guide to the reader through Impacts, Mitigating Measures, and Unavoidable Adverse Impacts.

Mitigating Measures are only shown for Wildlife, Visual Resources, Recreation and Livestock Grazing. Because they would receive no adverse impacts, no mitigating measures are shown for Climate, Geologic Setting, Topography, Cultural Resources, Paleontology, Mineral Resources and Transportation Networks. Adverse impacts on Air Quality, Soils, Water Resources, Vegetation, and Socio-Economics could not be mitigated. Unavoidable, adverse impacts are analyzed for Vegetation, Wildlife, Livestock Grazing, Forestry and Socio-Economics. Only major adverse impacts are analyzed as unavoidable.

Adverse Impacts That Cannot Be Avoided

This section presents an analysis of the unavoidable, adverse impacts which would result from implementation of the alternative. These impacts are those unavoidable, adverse impacts which could not be mitigated.

The following resource categories have no adverse, unavoidable impacts: Climate, Air Quality, Geologic Setting, Topography, Soils, Water Resources, Cultural Resources, Paleontology, Visual Resources, Recreation, Mineral Resources, and Transportation Networks. Numbers preceding impacts are the same numbers used to identify impacts.

Table VIII-14

MITIGATING MEASURES
NO GRAZING ALTERNATIVE

Impacts	Mitigating Measures	Reduction Due To Mitigation
WILDLIFE		
18. Restricted antelope movement (present of fences).	18. Encourage licensees to receive exchange of use privileges and thereby eliminate the need for fencing private and state lands to control trespass.	18. Adverse impact would be completely mitigated.
VISUAL RESOURCES		
21. Loss of open space values (presence of fences).	21. Same as # 18.	21. Same as #18.
22. Increased contrast (between public lands and private and state lands).	22. Same as #18.	22. Same as #18.
RECREATION		
25. Restricted ORV use (presence of fences).	25. Same as #18.	25. Same as #18.
LIVESTOCK		
27. Fence construction.	27. Same as #18.	27. Same as #18.

Source: Compiled by BLM Resource Specialists

Vegetation

10. Increased Wildfires

Although fire suppression would be a standard procedure, increased old vegetative growth would cause wildfires to spread more rapidly and consume more vegetation. Live vegetation could be destroyed with a resulting change in vegetative type and composition of species.

Wildlife

16. Habitat Changes

Elimination of livestock would cause habitat changes to woody and brushy species in some parts of the area. This would alter wildlife communities in favor of species more adapted to this type of environment. These habitat changes would be detrimental to grassland habitat species such as prairie dogs, burrowing owls, meadowlarks and horned larks.

Livestock Grazing

26. Loss of AUMs

The loss of 50,955 livestock AUMs, and subsequent reductions of livestock operations would be unavoidable under the no grazing alternative.

Forestry

30. Vegetative Competition

Higher seedling mortality would occur as a result of increased competition from ungrazed plants. Plants would remain ungrazed due to elimination of livestock. The impact on forestry would be unavoidable.

31. Increased Wildfires

Due to increased amount of vegetation, wildfires would start and spread more rapidly than at present. Based on historical data these wildfires would occur mostly in the pinyon-juniper subtype. Although there would be fire suppression activities, damage to trees could not be entirely avoided.

32, 33, 34, 35, 37. Loss of Ranch Operations, Loss of Receipts, Decline in Employment, Non-Grazing Economic Loss, Altered Socio-Cultural Expectations

The loss of ranch operations, reductions of receipts, decline of employment, non-grazing economic loss, economic activity in the study area and socio-cultural changes identified under the impact analysis of this alternative would be unavoidable. Under the no grazing alternative, ranching operations would be reduced by 38 and the economic activity in the ranching community would be reduced to $163,932 (on private and state lands in the ES Area). The overall net effect would be a loss in economic activity for the socio-economic study area (direct and indirect) of approximately $2.5 million. Attitude changes and changes in expectations of ranches and ranch families, identified under the impact analysis of this alternative would be unavoidable.

Short-Term Non-Use

Description

The short-term non-use alternative would result in the following level of management:

1. Grazing systems for the 57 allotments proposed for implementation under the proposed action (392,563 acres of public lands) would be revised to include periods of short-term non-use designed to restore plant vigor by recharging carbohydrate reserves. Under the short-term non-use alternative, the grazing system would provide for the rotation of pastures grazed and periods of rest. This system differs from the proposed action in that the frequency of pasture rotation would be increased and that no pasture would receive year-long rest (see Table VIII-15). Grazing periods would not exceed two months in duration and four to six months of non-use would follow (see Table VIII-16). The alternative would emphasize the maintenance of high energy levels (i.e., carbohydrate storage) of available forage to promote increased vigor and vegetative reproduction rather than seed production. Estimated acreage which are rested or grazed is shown in Table VIII-15.
2. Adjustments in the authorized stocking rates would be made as in the proposed action and in accordance with the 1975 BLM Resource Inventory to balance forage use with soil and vegetative production.
3. Range improvements would be the same as under the proposed action.
4. There would be a continuation of the other management functions for timber, wildlife, minerals, recreation, and other resources.
5. Trespass and crossing permits would be handled in the same manner as under the proposal.

. The need for road easements would be the same as in the proposed action.

Table VIII-17 shows the environmental impacts of the short-term non-use alternative. To aid in tracking, impacts have been numbered consecutively. Table VIII-17 summarizes these numbered impacts by resource. In addition, Table VIII-17 displays; (1) whether the impact is partially or totally mitigated by mitigating measures, (2) whether the impact (or part of the impact) is analyzed as an unavoidable, adverse impact. Table VIII-18 summarizes the impacts by allotment.

Table VIII-15

ESTIMATED ACRES RESTED OR GRAZED

Short-Term Non-Use Alternative

Alternative Grazing System	Allot-ments	Public Lands (Acres)	Year-long Rest	Spring Rest	Spring Graze	Summer Rest	Summer Graze	Fall Rest	Fall Graze	Winter Rest	Winter Graze
Short-Term Non-Use	57	392,563	-	294,423	98,140	294,423	98,140	294,423	98,140	294,423	98,140
Unallotted	1	96	96								
To Wildlife	3	424	424								
TOTAL	61	393,083	520	294,423	98,140	294,423	98,140	294,423	98,140	294,423	98,140

Source: BLM Records, Albuquerque District Office

Table VIII-16

TYPICAL SHORT-TERM NON-USE GRAZING SCHEDULE

Pasture	Period	Year 1	Year 2	Year 3	Year 4
A	April	Graze	Rest	Rest	Rest
	May	Rest	Rest	Rest	Graze
	June-July	Rest	Rest	Graze	Rest
	August	Rest	Graze	Rest	Rest
	September	Graze	Rest	Rest	Rest
	October-November	Rest	Rest	Rest	Graze
	December-January	Rest	Rest	Graze	Rest
	February-March	Rest	Graze	Rest	Rest
B	April	Rest	Graze	Rest	Rest
	May	Graze	Rest	Rest	Rest
	June-July	Rest	Rest	Rest	Graze
	August	Rest	Rest	Graze	Rest
	September	Rest	Graze	Rest	Rest
	October-November	Graze	Rest	Rest	Rest
	December-January	Rest	Rest	Rest	Graze
	February-March	Rest	Rest	Graze	Rest
C	April	Rest	Rest	Graze	Rest
	May	Rest	Graze	Rest	Rest
	June-July	Graze	Rest	Rest	Rest
	August	Rest	Rest	Rest	Graze
	September	Rest	Rest	Graze	Rest
	October-November	Rest	Graze	Rest	Rest
	December-January	Graze	Rest	Rest	Rest
	February-March	Rest	Rest	Rest	Graze
D	April	Rest	Rest	Rest	Graze
	May	Rest	Rest	Graze	Rest
	June-July	Rest	Graze	Rest	Rest
	August	Graze	Rest	Rest	Rest
	September	Rest	Rest	Rest	Graze
	October-November	Rest	Rest	Graze	Rest
	December-January	Rest	Graze	Rest	Rest
	February-March	Graze	Rest	Rest	Rest

Source: Texas Tech University - Range Plant and Range Ecosystem Studies Applicable to the Rio Puerco Area, New Mexico, June 1976.

Table VIII-17

SUMMARY OF ANTICIPATED IMPACTS BY RESOURCE

Short-Term Non-Use Alternative

Resource	Source of Impact	Impact		Magnitude of Impact		Mitigating Measures	Unavoidable Adverse Impacts
Vegetation	Short-term Non-use Grazing	1	Increased Forage Production	Area-wide long-term	+	No	No
Wildlife	Short-term Non-use Grazing	2	Increased Waterfowl Use	Area-wide long-term	+	No	No
		3	Disturbed Waterfowl Use	Area-wide long-term	-	No	No
		4	Reduced Competition	Area-wide long-term	+	No	No
		5	Reduced Browse Vigor	Area-wide long-term	-	No	Yes
		6	Reduced Turkey Habitat	Localized long-term	-	Yes	No
		7	Reduced Nesting Success	Localized long-term	-	No	Yes
		8	Reduced Food Availability for Seed Eaters	Area-wide long-term	-	No	Yes
		9	Improved Habitat for Small Grazing Wildlife	Area-wide long-term	+	No	No
Visual Resources	Short-term Non-use Grazing	10	Reduced Contrast	Area-wide long-term	+	No	No
Recreation	Short-term Non-use Grazing	11	Increased Hunting Activity	Area-wide long-term	+	No	No
		12	Increased Sightseeing	Area-wide long-term	+	No	No
Livestock Grazing	Short-term Non-use Grazing	13	Increased AUMs	Area-wide long-term	+	No	No
		14	Improved Response to Drought	Area-wide long-term	+	No	No
		15	Increased Livestock Movement	Area-wide long-term	-	No	Yes
		16	Combined Allotments	Area-wide long-term	-	No	Yes

+ Positive Impacts
- Negative Impacts

Source: Summarization of Short-term Non-use Alternative

Table VIII-18

SUMMARY OF IMPACTS BY ALLOTMENT

Short-term Non-use Alternative

Allotment Name	Allot. No.	Impact Number											
		2	3	5	6	7	8	9	10	13	14	15	16
Corrales Tierra	55	X	X					X	X	X	X	X	X
Senorito	19	X	X					X	X	X	X	X	X
Mesa Portales	17							X	X	X	X	X	X
Nacimiento	14							X	X	X	X	X	X
Ridge Top	24	X	X					X	X	X	X	X	X
Salado-Tapia	51	X	X					X	X	X	X	X	X
Arroyo Alamito	45	X	X					X	X	X	X	X	X
Arroyo Piedra Parada	54	X	X					X	X	X	X	X	X
Cachulie	39	X	X					X	X	X	X	X	X
Cebo Community	33	X	X					X	X	X	X	X	X
Coal Creek	29	X	X	X		X	X		X	X	X	X	X
El Banquito	49	X	X					X	X	X	X	X	X
Fork Rock Mesa	16	X	X					X	X	X	X	X	X
Forty-four	18	X	X					X	X	X	X	X	X
Gypsum Hill	61	X	X					X	X	X	X	X	X
Lagunitas	12	X	X					X	X	X	X	X	X
Ojo de los Pinos	8	X	X	X		X	X		X	X	X	X	X
Pelon	3	X	X	X		X	X		X	X	X	X	X
San Pablo	20	X	X					X	X	X	X	X	X
Shroyer	2	X	X	X		X	X		X	X	X	X	X
Arroyo Empedrado	36	X	X					X	X	X	X	X	
Azabache	42	X	X					X	X	X	X	X	
Banco de la Casa	52							X	X	X	X	X	
Cabezon Peak	44	X	X					X	X	X	X	X	
Canon del Camino	53	X	X					X	X	X	X	X	
Cerro Cuate	41	X	X					X	X	X	X	X	
Cucho Arroyo	57	X	X					X	X	X	X	X	
Dry Well	27	X	X					X	X	X	X	X	
Horn Arroyo	9	X	X	X		X	X		X	X	X	X	
Lost Valley	40	X	X	X		X	X	X	X	X	X	X	
Mesa Cortada	48							X	X	X	X	X	
North San Luis Mesa	37	X	X					X	X	X	X	X	
Pipeline	56	X	X	X		X	X	X	X	X	X	X	
Rio Salado Community	59	X	X	X		X	X	X	X	X	X	X	
Rock House	60	X	X					X	X	X	X	X	
San Luis Community	38	X	X	X		X	X		X	X	X	X	
San Ysidro Pasture	46	X	X					X	X	X	X	X	
Valle San Isidro	15	X	X	X		X	X		X	X	X	X	
Chico Crossing	43	X	X					X	X	X	X	X	
Continental Divide	1	X	X	X		X	X	X	X	X	X	X	
Dry Springs	5	X	X	X		X	X		X	X	X	X	
Eagle Mesa	23	X	X					X	X	X	X	X	
Guadalupe Community	47	X	X					X	X	X	X	X	
Penistaja	11	X	X	X		X	X	X	X	X	X	X	
Piedra Lumbre	28	X	X	X		X	X		X	X	X	X	
Torreon Wash	35	X	X					X	X	X	X	X	
Twin Butte	34	X	X					X	X	X	X	X	
Brandy	10	X	X	X		X	X	X	X	X	X	X	
Starr	4	X	X	X		X	X		X	X	X	X	
Ignacio Chavez Grant	50	X	X	X	X	X	X	X	X	X	X	X	
Chiuilla Community	7	X	X	X		X	X		X	X	X	X	
Elk Springs	30	X	X					X	X	X	X	X	X
Mighty Mite	58	X	X	X		X	X		X	X	X	X	X
Tres Hermanos	6	X	X	X		X	X		X	X	X	X	X
Canada Candelaria	31	X	X					X	X	X	X	X	
Los Pinos Arroyo	26	X	X					X	X	X	X	X	
Cerro Colorados	32	X	X					X	X	X	X	X	
Bama	21							X					
Molino	13		X					X					
Rock Ridge	25							X					
San Miguel	22	X	X					X					

Impacts 1, 4, 11 and 12 occur on every allotment.

Source: Summarized from the description of the Short-term Non-use Alternative and Impacts

Impacts are only shown for Vegetation, Wildlife, Visual Resources, Recreation and Livestock Grazing. Impacts on Climate, Air Quality, Topography, Geologic Setting, Soils, Water Resources, Cultural Resources, Paleontology, Mineral Resources, Forestry, Transportation Networks and Socio-Economic conditions would be the same as those of the proposed action. Impacts resulting from the construction and physical presence of range improvement would be identical to those described in the proposed action.

Impact Analysis

Vegetation

Source of Impact: Short-Term Non-Use Grazing

1. INCREASED FORAGE PRODUCTION

It is predicted that by the year 2000, production of forage (public lands and all private and state lands used in conjunction with public lands) under this alternative would be the same as under the proposed action (121,788 AUMs compiled at 50 percent utilization of key forage species for grazing animals). Other vegetative changes in cover and composition would be similar to the proposed action. Table II–44 shows present and projected vegetative ground cover under the proposal. The short-term non-use grazing system would favor vegetative production instead of seed production. This does not affect the final outcome but only the method by which it is achieved. According to Dahl, et al., (1976), reproduction from seeds by the major key forage species of the Rio Puerco ES Area is of minor consequence and in most cases, unnecessary. Dahl's conclusions are based upon extensive interpretations of many years of vegetative data and are supported by hundreds of other studies. This would be an area-wide, long-term, beneficial impact.

Wildlife

The short-term non-use alternative would provide a grazing system with periods of use and non-use, as in the proposed action. These systems would be formulated to produce and maintain the vegetation determined to be desirable for a particular allotment. The particular system selected for an allotment would be unique and would be designed to improve vigor for the key plant species in that allotment. In this regard and in the projects proposed, this alternative would be similar to the proposal. However, under this alternative the duration of periods of use and non-use would be shortened and the provisions for a full year's rest would be eliminated. This may not alter the total amount of forage produced, but would have an influence on forage composition and seed production. While either system would be designed to improve vigor for a designated key plant species, the full year's rest provided for under the proposal would ensure that other plant species would also respond (to some degree). Because of these differences, wildlife habitat would vary under the two systems.

As compared with the proposed action, the following assumptions are made in analyzing impacts on wildlife:

A. Short-term non-use would be less favorable to browse production. To permit such plants to maintain themselves in a diverse plant community, grazing must be adjusted to retain most of the apical meristems throughout a season or rhythm of growth (Dahl et al., 1976). The grazing system which would be implemented under the short-term non-use alternative would not meet this requirement.

B. The short-term non-use grazing system favors increased forage production and plant vigor while deemphasizing seed production.

C. The short-term non-use grazing system would allow livestock in more pastures during the growing season than under the proposed action, but would provide for short periods of rest, and would result in forage production similar to the proposal.

D. The grazing system on allotments presently under AMPs would be amended to the short-term non-use system.

Source of Impact: Short-Term Non-Use Grazing

2. INCREASED WATERFOWL USE

By concentrating livestock into one pasture and rotating that use from pasture to pasture, the intensity of stocking would increase in grazed pastures and would be reduced to zero in rested pastures. This would provide relief of existing impacts on waterfowl and shorebirds, resulting from the loss of cover and water contamination. In addition, the nesting potential of the area would be enhanced by the rotation system, which would permit the rest of approximately 25 percent of the reservoirs presently receiving year round use. This would be an area-wide, long-term, beneficial impact.

3. DISTURBED WATERFOWL USE

Grazing a pasture for one to two months, resting for four to six months and then grazing it again on areas presently under a rest or deferred rotation grazing system would result in all reservoirs shore lines being disturbed twice during the year. The results would be vegetative reduction, loss of cover, and water contamination from fecal matter. Grazing of reservoir margins precludes nesting of waterfowl and shorebirds through a lack of cover required for nest concealment. This also reduces the availability of green forage and insects common to an ungrazed situation. The grazing of at least 3/4 of the areas presently under AMPs during the primary waterfowl nesting periods would result in nest trampling and abandonment in excess of the existing situation. The lack of long periods of rest during the nesting season, and frequent movement of livestock resulting in greater potential for human and livestock disturbance of brooding birds could conceiveably reduce use by five to ten percent on areas presently under AMPs. This would be an area-wide, long-term, adverse impact.

4. REDUCED COMPETITION

Competition between livestock and big game would continue despite forage reservations for wildlife. Competition would be reduced from levels experienced in the existing situation but would be increased when compared to the proposed grazing systems. The use of each pasture during the March to mid-October period would increase competition among deer, antelope, and livestock for green forage and cause frequent disturbance during fawning and kidding. Fall and winter grazing use (mid-October to March) would also increase competition for browse and subject big game to increased disturbance. During all seasons, the frequent pasture rotations and resultant disturbances would potentially exclude big game from those pastures providing the most desirable forage. As compared to the existing environment, however, this would be an area-wide, long-term, beneficial impact.

5. REDUCED BROWSE VIGOR

With this alternative, existing allotments having a rest or deferred rotation system would be placed under short-term non-use. The dual use of browse species on big game winter ranges accessible to livestock throughout the year would reduce browse vigor and abundance. This would further reduce already limited browse and potentially reduce big game carrying capacity. Compared with the existing situation, big game winter habitat on areas under existing AMPs would potentially decline by the year 2000, by 25 to 50 deer and 10 to 15 elk. This would be offset by areas not presently under AMPs and would result in an increase in the long-term which actually increases both deer and elk numbers. This reduced vigor on areas presently under AMP is an area-wide, long-term adverse impact.

6. REDUCED TURKEY HABITAT

The existing rest rotation grazing system on the Ignacio Chavez Grant AMP would be amended to a short-term non-use system. The annual summer and spring grazing of this allotment would affect the only population of wild turkeys which occupy the area. Grazing during this period would increase the incidence of nest trampling, cover reduction and removal of grass and forb seed production over large areas, resulting in food scarcity and possible starvation of wintering birds. The anticipated effect on carrying capacity for wild turkey under this alternative would be a reduction in habitat for 10 to 15 birds. The reduction in turkey habitat is a localized, long-term, adverse impact.

7. REDUCED NESTING SUCCESS

Ground nesting birds such as scaled quail, horned larks, and meadowlarks, would have a reduced potential for nesting success on those areas under an existing rest or deferred rotation grazing systems. This would result from an increased probability of nest trampling and cover removal. Livestock presence per pasture per year would increase on existing AMP allotments (143,865 acres) due to more frequent rotation. As a result, approximately 75 percent of the pastures in a particular allotment would receive some livestock disturbance during the primary nesting season. In the existing situation on rest rotation grazing systems, approximately 50 percent of the allotment is rested during the nesting season. The reduced nesting success would be a localized, long-term, adverse impact.

8. REDUCED FOOD AVAILABILITY FOR SEED EATERS

The reduced seed production resulting under the short-term non-use grazing system would adversely affect the whole spectrum of seed eating birds and small mammals. Seed eaters have a physiological need for high protein food and are normally most directly affected by reductions in such food availability. Areas of habitat most directly affected under this alternative would be the allotments under existing AMPs. Non-AMP areas (249,218 acres) areas should show an increase in seed availability over the existing situation. The reduced seed availability would be an area-wide long-term adverse impact.

9. IMPROVED HABITAT FOR SMALL GRAZING WILDLIFE

The alternative would increase forage production on existing non-AMP areas (249,218 acres). This would provide additional food for species such as cottontail rabbits, jackrabbits and a variety of small rodents. In addition, the improved plant vigor would provide increased cover and an increased insect population, which would benefit a wide variety of insectivores. This potential increase cannot be quantified with existing data, but the improvement would be an area-wide, long-term, beneficial impact.

Visual Resources

Source of Impact: Short-Term Non-Use Grazing

10. REDUCED CONTRAST

Visual impacts of this alternative would be similar to those of the proposed action; however, the impacts associated with pasture development would be reduced. Because all pastures would be used every year and no pasture would be allowed yearlong rest, the contrast in the basic elements of form, line, color, and texture resulting from differences in vegetative density and variety between use and non-use pastures would be less obvious. This would be an area-wide, long-term, beneficial impact.

Recreation

Anticipated changes in overall recreation use levels under the short-term non-use alternative are shown in Table VIII-19.

Table VIII-19
Anticipated Recreation Use Levels
Short-Term Non-Use
Year 2000

Activity	Visitor Use Days
ORV use	182,000
Sightseeing use	450,000
Primitive/Natural Area use	8,000
Hunting	64,000

Data, based on impacts of this alternative, present recreational use levels and recreational use demand projection through the year 2000, using the 1976 Statewide Comprehensive Outdoor Recreation Plan—(SCORP) as a guideline (compiled by the N.M. State Planning Office).

11. INCREASED HUNTING ACTIVITY

Compared to the existing situation, overall hunting activity would increase by 18,000 visitor days. Hunting use levels expected under this alternative are listed in Table VIII-19. This would be an area-wide, long-term, beneficial impact.

12. INCREASED SIGHTSEEING OPPORTUNITIES

Recreational sightseeing would be enhanced by the beneficial impacts on visual resources. This would be an area-wide, long-term, beneficial impact. Table VIII-19 shows an estimated increase of 126,000 sightseeing visitor day in comparison to the present situation.

Livestock Grazing

Source of Impact: Short-Term Non-Use Grazing

13. INCREASED AUMs

Under this alternative, favorable vegetative response would be realized sooner than with the proposed action, and increases in livestock AUMs would be realized five years sooner than the proposal (Dahl, et al, 1976). This would be an area-wide, long-term beneficial impact.

14. IMPROVED RESPONSE TO DROUGHT CONDITIONS

Areas utilizing the short-term non-use grazing system would tend to survive drought periods without having to reduce livestock numbers drastically (Dahl, et al., 1976). This would be an area-wide, long-term, beneficial impact on livestock grazing.

15. INCREASED LIVESTOCK MOVEMENT

Adverse impacts of the short-term non-use alternative would be the additional moving cost and time required of the licensee to move cattle at one or two month intervals. Moving cost may be expected to increase by 15 to 20 percent as a result of this alternative. Cattle weight losses may also be expected due to the increased movement and handling of livestock. This would be an area-wide, long-term, adverse impact.

16. COMBINED ALLOTMENTS

Allotments with less than four pastures would be required to combine with neighboring allotments or move their cattle to other grazing lands (private and state) during the non-use periods. This would be an area-wide, long-term, adverse impact.

Mitigating Measures

The measures analyzed in the section are actions that would reduce or eliminate adverse impacts identified in the impact analysis section of the alternative. Each measure is analyzed in relation to a specific component of the alternative. All measures are considered feasible under existing technology and would be required if the alternative is approved.

Table VIII-20 has three columns used to display mitigating measures. The first column identifies the impact. The second column is the mitigating measure to be applied. The third column is a measure of how much the mitigation measure would reduce the impact. The numbers which appear in the three columns in Table VIII-20 are the same numbers which appear in the impact analysis section. These numbers can be used as a guide to the reader through Impacts, Mitigating Measures, and Unavoidable Adverse Impacts. Mitigating Measures are only shown for Wildlife. No other resources (excluding Livestock Grazing) would receive adverse impacts which differ from those anticipated from the proposed action. Adverse impacts on Livestock Grazing could not be mitigated but are shown as unavoidable adverse impacts. (Only major adverse impacts are analyzed as unavoidable.)

Adverse Impacts That Cannot Be Avoided

This section presents an analysis of the unavoidable adverse impacts which would result from implementation of this alternative. These impacts are those adverse impacts which could not be mitigated.

The following resource categories have no adverse unavoidable impacts which would differ from the proposal: Climate, Air Quality, Geologic Setting, Topography, Soils, Water Resources, Vegetation, Cultural Resources, Paleontology, Visual Resources, Recreation, Mineral Resources, Forestry, Transportation Networks, and Socio-Economics. Numbers preceding impacts are the same numbers used to identify impacts in previous sections in the analysis of this alternative.

Wildlife

5. REDUCED BROWSE VIGOR

Under the short-term non-use alternative, heavy use of browse species in big game winter ranges would reduce browse vigor. This reduced vigor and abundance of browse species would reduce habitat for deer and elk resulting in reductions of 25–50 deer and 10–15 elk. This impact would be unavoidable.

7. REDUCED NESTING SUCCESS

Reduced nesting success for ground nesting birds would result from the frequent disturbance of all pastures by livestock grazing during the primary nesting season. Because constant movement would be required under the short-term non-use grazing system, this impact would be unavoidable.

8. REDUCED FOOD AVAILABILITY FOR SEED EATERS

On existing AMP areas (143,865 acres) seed production will be reduced as the result of the introduction of the grazing system used in this alternative. Reduced food availability for seed eating birds and small mammals would, therefore, be unavoidable.

Livestock Grazing

15. INCREASED LIVESTOCK MOVEMENT

Frequent livestock movement at one or two month intervals could not be avoided under the short-term non-use grazing system. The increased expense to livestock operators (15 to 20 percent) and potential livestock weight loss resulting from this requirement would also be unavoidable.

16. COMBINED ALLOTMENTS

The short-term non-use grazing system would require four pastures. Allotments with less pastures or with insufficient private or state leased lands would be required to combine with neighboring allotments. This impact would be unavoidable.

Forage Maximization

Description

The forage maximization alternative would provide an intensive program of range management techniques to achieve optimum forage production for livestock. This would involve vegetative manipulation on 61,390 acres to convert existing sagebrush and pinyon-juniper vegetation to grassland. The range improvements and AMPs described under the proposed action would also be implemented. Specific operations under this alternative are as follows:

1. Adjustments in the authorized stocking rates would be made as in the proposed action and in accordance with the 1975 BLM Resource Inventory to balance proper forage utilization with soil and vegetative production.

Table VIII-20

MITIGATING MEASURES
SHORT-TERM NON-USE ALTERNATIVE

Impacts	Mitigating Measures	Reduction Due To Mitigation
WILDLIFE		
6. Reduced turkey habitat.	6. Retain the existing rest-rotation grazing system on the Ignacio Chavez Grant Allotment.	6. No unavoidable adverse impacts.

Source: Compiled by BLM Resource Specialists

2. The proposed action of implementing intensive management on 57 allotments would take place. In addition, 61,390 acres would receive vegetative manipulation to convert pinyon-juniper or sagebrush into areas of more productive forage plants for livestock use. Vegetative manipulation projects would include: (a) prescribed burning of sagebrush (8,200 acres) or previously chained pinyon-juniper sub-types (9,120 acres), followed by aerial seeding; (b) rotary cutting of sagebrush sub-type (13,840 acres) to increase desirable forage-producing species; (c) spraying to kill evenly aged sagebrush stands, allowing more desirable plant species to increase (3,500 acres), (d) plowing sagebrush (4,200 acres), followed by drilling to reseed with a mixture of shrubs, cool and warm-season grasses, and forbs; and (e) chaining (mechanical shrub removal by dragging a length of heavy chain between two tractors) pinyon-juniper (22,530 acres), followed by aerial seeding where necessary. Table VIII-21 shows the type of vegetative manipulation, acres involved, and the projected livestock AUMs which would become available on each allotment after vegetative manipulation.
3. Range improvements would be the same as under the proposed action, with the additional 61,390 acres receiving vegetative manipulation.
4. As in the proposed action, the ES Area would continue to be managed for timber, wildlife, minerals, recreation, and other resources.
5. The standards for prescribed burning and rotary cutting would be as described under the proposed action (Chapter I). Spraying, plowing and burning operations would conform to the specifications provided in Appendix VIII-1.
6. Trespass and crossing permits would be handled in the same manner as under the existing environment.

Table VIII-22 shows the environmental impacts of the Forage Maximization alternative. To aid in tracking, impacts have been numbered consecutively. Table VIII-22 summarizes these numbered impacts by resource. In addition Table VIII-22 displays; (1) whether the impact is partially or totally mitigated by mitigating measures; (2) whether the impacts (or part of the impact) is analyzed as an adverse residual impact. Table VIII-23 summarizes the impacts by allotment.

Under forage maximization, impacts resulting from the grazing system, proposed projects and ungrazed allotments would be the same as described under the proposed action. The reader is directed to Chapter III for a full discussion of impacts resulting from these sources. This section is intended to provide a discussion of impacts resulting from vegetative manipulation, which would exceed those of the proposal and should be used in addition to Chapter III for a complete analysis of these impacts.

Impacts on Climate, Geologic Setting, Topography, Paleontology, Mineral Resources and Transportation Networks would be as described under the proposed action.

Impact Analysis

Air Quality

Source of Impact: Vegetative Manipulation

1. INCREASED DUST AND GASES

Under this alternative, adverse impacts on air quality would result from plowing (4,200 acres), chaining (22,530 acres), or burning (1,732 acres). Plowing, chaining, and burning operations in themselves reduce air quality because they increase particulate matter and gasses; they also expose the soil to wind erosion. These conditions would be localized, however, and would cause minimal, short-term, adverse effects on air quality.

Soils

Source of Impacts: Vegetative Manipulation

2. SOIL CONTAMINATION

Spraying projects on 3,500 acres in the Penistaja and Cerro Colorados allotments would reduce total cover and increase sedimentation. Impacts on these areas would occur as a result of soil contamination from 2,4-D, the chemical which would be used on these projects. Each project would be submitted for review and approval by the BLM Director. Projects would not be approved if: water quality would be degraded; or, hazards exist that would unnecessarily threaten fish, wildlife, their food chains, or other components of the natural environment. In addition, the President's Cabinet Committee on Environment would review the project for its overall effectiveness, economic feasibility, and potential health hazards for wildlife and the natural environment, people, and livestock. This soil contamination would be a localized, short-term, adverse impact.

3. REDUCED OVERLAND FLOW

Two-thirds of the pinyon-juniper acres which would undergo vegetative manipulation (approximately 32,000 acres) consist of Litle-Las Lucas (4,035 acres), Billings-Persayo (5,610 acres), and Travessilla-Persayo soils (13,891 acres). Because of vegetative manipulation, sediment yield from these soil associations would decrease at a reduced rate from that expected under the proposed action. However, by the year 2000 sediment yield would be slightly less than that of the proposed action; this difference would be too slight to accurately quantify. This would be a localized, long-term, beneficial impact.

Table VIII-21

SUMMARY OF PROPOSED VEGETATIVE MANIPULATION IN THE RIO PUERCO ES AREA

Forage Maximization Alternative

Allotment Name	No.	Sagebrush				Pinyon-juniper		Additional AUMs Available to Livestock Through Manipulation
		Plow	Burn	Rotary Cut	Spray	Chain	Burn	
Corrales Tierra	55							
Senorito	19							
Mesa Portales	17							
Nacimiento	14			200		500		109
Ridge Top	24							
Salado-Tapia	51							
Arroyo Alamito	45							
Arroyo Piedra Parada	54					240		37
Cachulie	39							
Cebo Community	33					1,000		157
Coal Creek	29			400		700	380	291
El Banquito	49							
Fork Rock Mesa	16					500	500	235
Forty-four	18							
Gypsum Hill	61							
Lagunitas	12			480		1,280		276
Ojo de los Pinos	8		1,200					187
Pelon	3	500		1,000		300		362
San Pablo	20							
Shroyer	2	800						250
Arroyo Empedrado	36					640		100
Azabache	42							
Banco de la Casa	52							
Cabezon Peak	44							
Canon del Camino	53							
Cerro Cuate	41							
Cucho Arroyo	57					2,000		316
Dry Well	27							
Horn Arroyo	9		1,180	1,180				371
Lost Valley	40							
Mesa Cortada	48							
North San Luis Mesa	37			400		320		112
Pipeline	56					740		116
Rio Salado Community	59							
Rock House	60							
San Luis Community	38			100		900	900	440
San Ysidro Pasture	46							
Valle San Isidro	15		600	1,640		200		383
Chico Crossing	43					1,000	600	357
Continental Divide	1					640		100
Dry Springs	5		200	1,600		640		382
Eagle Mesa	23	1,000		920		600		552
Guadalupe Community	47							
Penistaja	11	1,500		320	1,500	1,000	1,000	1,133
Piedra Lumbre	28			620		900		239
Torreon Wash	35					1,000	1,000	473
Twin Butte	34		1,000	600		2,000		566
Brandy	10		500	1,240		2,160	2,800	1,488
Starr	4	400		2,000			200	503
Ignacio Chavez Grant	50							
Chiuilla Community	7		220	80		120		65
Elk Springs	30							
Mighty Mite	58							
Tres Hermanos	6		1,300			1,500	1,100	783
Canada Candalaria	31			900		600	600	423
Los Pinos Arroyo	26			160		300		72
Cerro Colorados	32		2,000		2,000	750		619
Bama	21							
Molino	13							
Rock Ridge	25							
San Miguel	22							
TOTAL		4,200	8,200	13,840	3,500	22,530	9,120	11,497
Estimated Cost Per Acre (1976)		$19.25	$5.34	$8.90	$6.00	$5.00	$5.34	
Estimated Total Cost		$80,850	$43,780	$123,176	$21,000	$112,650	$48,700	$430,164

Total Treatment Area: 61,390 Acres

Source: AMP Files for the Proposed Action

Table VIII-22

SUMMARY OF ANTICIPATED IMPACTS BY RESOURCE

Forage Maximization Alternative

Resource	Source of Impact	Impact		Magnitude of Impact		Mitigating Measures	Unavoidable Adverse Impacts
Air Quality	Vegetative Manipulation	1	Increased Dust and Gases	Localized short-term	-	No	No
Soils	Vegetative Manipulation	2	Soil Contamination	Localized short-term	-	No	Yes
		3	Reduced Overland Flow	Localized long-term	+	No	No
Water Resources	Vegetative Manipulation	4	Decreased Runoff	Localized long-term	+	No	No
Vegetation	Vegetative Manipulation	5	Increased Production	Area-wide long-term	+	No	No
Wildlife	Vegetative Manipulation	6	Change in Big Game Use	Localized short-term	+	No	No
		7	Decreased Diversity In Wildlife Species	Localized long-term	-	Yes	Yes
		8	Wildlife Disturbance	Localized short-term	-	No	Yes
		9	Invertebrate Disturbance	Localized short-term	-	No	Yes
Cultural Resources	Vegetative Manipulation	10	Disturbance of Cultural Resources	Localized long-term	-	Yes	Yes
Visual Resources	Vegetative Manipulation	11	Increased Contrast	Localized long-term	-	No	Yes
Recreation	Vegetative Manipulation	12	Increased Rec. Opportunities	Localized short-term	-	No	No
Livestock Grazing	Vegetative Manipulation	13	Increased AUMs	Localized long-term	+	No	No
		14	Non-Use Following Vegetative Manipulation	Localized short-term	-	Yes	Yes
Forestry	Vegetative Manipulation	15	Ponderosa Pine Damage	Localized long-term	-	Yes	Yes
		16	Increased Firewood Availability	Area-wide short-term	+	No	No
		17	Reduced Firewood Availability	Area-wide long-term	-	No	Yes
Socio-Economics	Vegetative Manipulation	18	Larger Ranch Operations	Area-wide long-term	+	No	No
		19	Increased Receipts	Area-wide long-term	+	No	No
		20	Increased Employment and Population	Area-wide long-term	+	No	No
		21	Increased Recreation Receipts	Area-wide long-term	+	No	No
		22	Socio-Cultural Factors	Area-wide long-term	+	No	No

+ Positive Impact
- Negative Impact

Source: Summarization of Forage Maximization Alternative

Table VIII-23

SUMMARY OF IMPACTS BY ALLOTMENT

Forage Maximization Alternative

Allotment Name	Allot. No.	Impact Number 2	3	4	5	6	7	8	9	10	11	13	14	15	16	17
Corrales Tierra	55		X	X	X		X	X		X	X	X	X	X	X	X
Senorito	19															
Mesa Portales	17															
Nacimiento	14															
Ridge Top	24															
Salado-Tapia	51															
Arroyo Alamito	45															
Arroyo Piedra Parada	54		X	X	X		X	X		X	X	X	X	X	X	X
Cachulie	39															
Cebo Community	33		X	X	X		X	X		X	X	X	X	X	X	X
Coal Creek	29			X	X	X	X	X	X	X	X	X	X	X	X	X
El Banquito	49															
Fork Rock Mesa	16			X	X	X	X	X	X	X	X	X	X	X	X	X
Forty-four	18															
Gypsum Hill	61															
Lagunitas	12		X	X	X		X	X		X	X	X	X	X	X	X
Ojo de los Pinos	8			X	X		X	X	X	X	X	X	X			
Pelon	3		X	X	X		X	X		X	X	X	X	X	X	X
San Pablo	20															
Shroyer	2									X	X	X	X			
Arroyo Empedrado	36		X	X	X		X	X		X	X	X	X	X	X	X
Azabache	42															
Banco de la Casa	52															
Cabezon Peak	44															
Canon del Camino	53															
Cerro Cuate	41															
Cucho Arroyo	57		X	X	X		X	X		X	X	X	X	X	X	X
Dry Well	27															
Horn Arroyo	9			X	X			X	X	X	X	X	X			
Lost Valley	40															
Mesa Cortada	48															
North San Luis Mesa	37		X	X	X		X	X		X	X	X	X	X	X	X
Pipeline	56		X	X	X		X	X		X	X	X	X	X	X	X
Rio Salado Community	59															
Rock House	60															
San Luis Community	38		X	X	X	X	X	X	X	X	X	X	X		X	X
San Ysidro Pasture	46															
Valle San Isidro	15			X	X		X	X		X	X	X	X	X	X	X
Chico Crossing	43		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Continental Divide	1		X	X	X		X	X		X	X	X	X	X	X	X
Dry Springs	5		X	X	X		X	X	X	X	X	X	X	X	X	X
Eagle Mesa	23			X	X		X			X	X	X	X	X	X	X
Guadalupe Community	47															
Penistaja	11	X		X	X	X	X	X	X	X	X	X	X	X	X	X
Piedra Lumbre	28			X	X		X	X		X	X	X	X	X	X	X
Torreon Wash	35		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Twin Butte	34		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brandy	10		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Starr	4			X	X	X	X	X	X	X	X	X	X	X		
Ignacio Chavez Grant	50															
Chiuilla Community	7		X	X	X		X	X	X	X	X	X	X	X	X	X
Elk Springs	30															
Mighty Mite	58															
Tres Hermanos	6		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Canada Candelaria	31		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Los Pinos Arroyo	26			X	X		X	X		X	X	X	X	X	X	X
Cerro Colorados	32	X	X	X	X		X	X	X	X	X	X	X	X	X	X
Bama	21															
Molino	13															
Rock Ridge	25															
San Miguel	22															

Impacts 1, 12, 18, 19, 20, 21 and 22 occur in all allotments.

Source: Summarized from the description of the Forage Maximization Alternative and Impacts

Water Resources

Source of Impact: Vegetative Manipulation

4. DECREASED RUNOFF

Overall impacts on water resources would differ little from those of the proposed action. However, site specific impacts due to treatments would result in runoff rates which differ from the proposal as follows:

A. A slight increase in runoff would result on treated sagebrush areas, amounting to less than one percent over 29,740 acres.
B. A slight decrease in runoff would occur from treated pinyon-juniper areas, amounting to about four percent over 31,650 acres.

The overall effect would be a slight decrease in total runoff over the area which would be a localized, long-term, beneficial impact.

Vegetation

Source of Impact: Vegetative Manipulation

5. INCREASED FORAGE PRODUCTION

The conversion of 29,740 acres of sagebrush and 31,650 acres of pinyon-juniper to the grass aspect would be a beneficial impact on forage production. Two years after these projects are completed, production levels would be equivalent to those expected on existing grasslands by the year 2000. It is estimated that overall vegetative production by 2000 would increase to 133,285 AUMs as compared to existing production of 69,446 AUMs (figured at 50 percent utilization of key forage species for grazing animals on public lands and other lands used in conjunction with public lands).

Composition and distribution of species would vary according to seeding mixtures used and available native plants present on unseeded areas. Increased forage production would be an area-wide, long-term, beneficial impact.

Wildlife

All wildlife impacts analyzed in Chapter III would occur under the forage maximization alternative. However, major differences in impacts would result from the extensive vegetative manipulation proposed under this alternative. Approximately 29,740 acres of sagebrush and 31,650 acres of pinyon-juniper habitat would be reduced, while 61,390 acres of new grassland would be created.

6. CHANGE IN BIG GAME USE

Burning pinyon-juniper areas used by elk or deer would effectively reduce big game use of these areas until regrowth would again provide food (approximately one grazing season). In two to five years big game use of such areas would increase. The overall effect by the year 2000 would be most directly influenced by the livestock grazing system and would not be significantly different from the proposed action.

During a burn, deer normally move ahead of the fire and are seldom directly injured (Taber and Dasmann, 1957). Lack of food and cover would keep them from re-occupying their home ranges on the area, however, until browse would begin sprouting from root crowns or seed, usually the growing season following the burn. In their study of three natural deer populations in California, Taber and Dasmann (1957) showed a significant increase of deer on burned areas immediately following the burn. However, deer use declined during the following years (about five years) to a point where deer populations returned to that which preceded the burn. They attributed the increased use to immigration from surrounding habitat rather than an actual population increase. These investigators also observed that mortality due to hunting and other forms of predation increased on burned areas, due to increased exposure. They also found that populations decreased during the winter following the burn in areas where there was little heavy cover in the periphery of the burned areas.

The magnitude of big game use change in the Rio Puerco ES Area would probably differ from that described by Taber and Dasmann (1957). There would be short-term increases in big game use, followed by a long-term period of stability at use levels below short-term peaks.

Deer populations at chained locations would respond in a similar fashion as in burned areas, except that the initial exodus would not be as great. Chaining would primarily break off old woody growth and would leave some tender new growth on browse species untouched. Overall, the change in big game use would be a localized, short-term, beneficial impact.

7. DECREASED DIVERSITY IN WILDLIFE SPECIES

The proposed vegetative manipulation would be beneficial to the seven grassland bird species (see Supplementary Reference II-4 at the Albuquerque

District Office) but would reduce total habitat for woodland and brush avifauna. Brewer's sparrow and the vesper sparrow would be eliminated from the treatment areas, while horned larks and meadowlarks would be provided increased habitat. Islands of brushy and woody habitat intentionally left undisturbed would provide additional edge for a greater overall number of species to use than usually found in the area.

Small mammals such as cottontail rabbit, white-footed mouse, woodrat, porcupine, and tree squirrel would suffer habitat loss, while populations of prairie dogs, antelope, squirrels, and kangaroo rats would increase. This would be a localized, long-term, adverse impact.

8. WILDLIFE DISTURBANCE

Mechanical forms of vegetative manipulation would disturb dens and nests. Burning would also disturb a number of small mammals, birds and reptiles and would cause nest abandonment, as well as nest and den destruction. Spraying would cause slightly less disturbance. Overall, this would be a localized, short-term, adverse impact which would be negligible by the year 2000.

9. INVERTEBRATE DISTURBANCE

Arthropods would be immediately eliminated by the controlled burn vegetative manipulation (17,320 acres); their numbers would also be reduced by some of the other methods used. However, this group quickly responds to habitat change and would return to the area within a short period following the treatment, particularly since the treatment is expected to stimulate vegetative response. The disturbance of invertebrates would be a short-term, adverse impact.

Cultural Resources

Source of Impact: Vegetative Manipulation

10. DISTURBANCE OF CULTURAL RESOURCES

The forage maximization alternative would unavoidably involve the commitment of cultural resources to salvage. The extent of disturbance of cultural resources which might result from this alternative may alter the potential for cultural resource management in the area. This would be a localized, long-term, adverse impact.

Visual Resources

Impacts resulting from the grazing system implemented under this alternative would be comparable to those described in Chapter III, Impacts Of The Proposed Action.

Source of Impact: Vegetative Manipulation

11. INCREASED CONTRAST

Visual impacts resulting from vegetative manipulation would be comparable to those described in the proposed action, but to a greater degree. 61,390 acres or fifteen percent of public lands would undergo vegetative manipulation as opposed to less than one percent or 2,525 acres in the proposed action. Chained pinyon-juniper areas (22,530 acres) would cause increased visual contrasts with adjacent vegetation. This would be a localized, long-term, adverse impact.

Recreation

Impacts on recreational resources resulting from the grazing system implemented under this alternative would be comparable to those described in the proposed action (see Chapters III, IV and V).

Source of Impact: Vegetative Manipulation

12. INCREASED RECREATIONAL OPPORTUNITIES

Under the forage maximization alternative, recreation use would increase above existing use. However, when compared to the proposed action, the forage maximization alternative would result in reduced recreation use. This would be caused by land alterations from vegetative manipulation (61,390 acres). Vegetative manipulation would occur during the season when use demands are normally highest (see Table VIII-24).

Table VIII-24
Anticipated Recreation Use Levels
Forage Maximization
Year 2000

Activity	Visitor Use Days
ORV	191,000
Sightseeing	389,000
Primitive/Natural	7,000
Hunting	52,000

Data, based on impacts of this alternative, present recreational use levels and recreational use demand projections through the year 2000 using the 1976 Statewide Comprehensive Outdoor Recreation Plan—SCORP (compiled by N.M. State Planning Office as a guideline).

Livestock Grazing

Source of Impact: Vegetative Manipulation

13. INCREASED AUMs

Under the forage maximization alternative, there would be 102,646 livestock AUMs available on public lands by the year 2000 (computed at 50 percent utilization of key forage species for grazing animals). Management practices along with vegetative manipulation would increase forage more than that expected from the proposed action. This would permit the expansion of livestock use on public lands by an additional 11,497 AUMs. This increase in AUMs would be a localized, long-term, beneficial impact.

14. NON-USE FOLLOWING VEGETATIVE MANIPULATION

The requirement for periods of non-use after vegetative treatments would cause ranchers to find other places to graze their livestock while the treated area recovers. These periods of non-use would create localized short-term adverse impacts on the grazing operations.

Forestry

The forage maximization alternative would result in greater impacts on forestry resources than those of the proposed action or the other alternatives. It would have all of the impacts of the proposed action, as well as those resulting from additional vegetative manipulation (as described below).

Source of Impact: Vegetative Manipulation

15. PONDEROSA PINE DAMAGE

Burning and chaining would have adverse impacts on ponderosa pine stands in or adjacent to old chainings. These stands contain slash which would provide fuel for fires which could kill or weaken ponderosa pine. Such trees would be more susceptible to insect infestations and disease.

The alternative also proposed new chaining of 22,530 acres of pinyon-juniper. Many of these areas contain scattered ponderosa pine which could also be destroyed by chaining. Burning of these areas would create the same problems as burning of existing chainings (killing unchained areas of ponderosa pine or actual burning of seedlings). This would be a localized, long-term, adverse impact.

16. INCREASED FIREWOOD AVAILABILITY

New chainings would provide an abundant short-term supply of dead and down firewood. This would be an area-wide, short-term, beneficial impact.

17. REDUCED FIREWOOD AVAILABILITY

The overall reduction of pinyon-juniper vegetation would reduce future options for firewood management. This would be an area-wide, long-term, adverse impact.

Socio-Economics

Source of Impact: Vegetative Manipulation

18. LARGER RANCH OPERATION

Under forage maximization, the total number of ranches in the Rio Puerco ES Area would remain the same; however, the economic conditions of these ranches would change. Subsistance ranches would decline from 84 to 47 and small ranches would increase slightly in number from 42 to 55. Medium sized ranches would increase from 8 to 25 (a 213 percent increase) and seven of the existing ranches would move into the large ranch category. The segment of the population in ranching would remain the same as under the proposed action. This would be an area-wide, long-term, beneficial impact.

19. INCREASED RECEIPTS

Under the forage maximization alternative, available AUMs would increase from 50,955 to 102,646. This total of 102,646 would be the equivalent of 8,554 cattle on public lands. At a 90 percent calf crop, 7,699 calves weighing 430 pounds would produce 3,310,570 pounds of beef. At a projected price of 92.4 cents per pound, it is estimated that this would result in $3,058,966 in receipts from the sale of calves on public lands. A summary of the average receipts, costs and returns to ranch operators is provided on Table VIII-25. This would be an area-wide, long-term, beneficial impact.

20. INCREASED EMPLOYMENT AND POPULATION

Employment within the ranching sector would increase by 72 new jobs and an additional 17 new jobs would also be created outside of the ranching sector as a result of the anticipated increases expected under the alternative. Population would remain at existing levels within the ranching sector of the ES Area, but would increase in the surrounding study area (Gray and English, 1976).

Table VIII-25

SUMMARY OF RECEIPTS, COSTS, AND RETURNS PER RANCH
FORAGE MAXIMIZATION ALTERNATIVE
RIO PUERCO ES AREA AND SOCIO ECONOMIC STUDY AREA
YEAR 2000

Item	Subsistence Ranch	Small Ranch	Medium-sized Ranch	Large Ranch	Rio Puerco Allotment
	....	....	(dollars)	....	....
Receipts:					
Calves	8,461	24,719	66,439	107,554	4,299,385
Steers and Heifers	953	4,695	13,191	21,341	791,820
Cows and Bulls	188	3,899	18,755	30,316	860,230
Crops and Other	0	0	0	0	0
TOTAL	9,602	33,313	98,385	159,211	5,951,435
Costs:					
Feed	638	3,596	7,170	14,553	527,165
Leases and Grazing Fees	711	2,456	5,561	11,585	401,923
Other Livestock Expense	542	3,048	7,346	15,985	495,813
Machinery	1,953	4,875	6,950	14,115	692,579
Improvements	471	3,018	2,761	7,817	342,437
Property Taxes	125	887	1,285	4,206	121,291
Hired Labor	137	912	3,821	8,307	202,437
Other	423	2,582	5,106	7,307	356,551
TOTAL	5,000	21,374	40,000	83,875	3,140,196
Return to Operator and Area for Labor, Management, and Capital	4,602	11,939	58,385	75,336	2,811,239

Source: Socio-Economic Impacts of Proposed Action and Alternatives for the Rio Puerco Allotment; Environmental Impact Report, English and Gray, NMSU, 1976.

This would be an area-wide, long-term, beneficial impact.

21. INCREASED RECREATION RECEIPTS

Data on recreation indicates that economic returns resulting from recreational resources would increase. However, the total increase in recreational receipts under this alternative would be less than under the proposed action and other alternatives. Using the data provided under recreation and the range of values in determining the economic impacts of AMPs (ORV, $4 to $6; sightseeing, $4 to $6; primitive/natural areas, $4 to $6; deer hunting, $11 to $25; elk hunting, $20 to $65; small game hunting, $11 to $20; and upland game hunting, $8 to $15) total receipts from recreation would be an increase of $431,000 to $715,500 over existing returns. This would be an area-wide, long-term, beneficial impact.

22. SOCIO-CULTURAL FACTORS

Attitudes under the alternative would be similar to the proposed action. However, the anticipated increase in income and the size of ranching operations would improve lifestyles and result in slightly higher expectations. This would be an area-wide, long-term, beneficial impact.

Mitigating Measures

The measures analyzed in this section are actions which would reduce or eliminate adverse impacts identified in the impact analysis of the proposal. Each measure is analyzed in relation to vegetative manipulation. Other impacts under the alternative have been discussed in Chapters III, IV and V. All measures are considered feasible under existing technology and would be required if the alternative is approved.

Table VIII-26 has three columns used to display mitigating measures. The first column identifies the impact. The second column is the mitigation measure to be applied. The third column is a measure of how much the mitigating measure would reduce the impact. The numbers which appear in the three columns in Table VIII-26 are the same numbers which appear in the impact analysis. These numbers can be used as a guide to the reader through Impacts, Mitigating Measures, and Unavoidable Adverse Impacts. Mitigating measures are only shown for Wildlife, Cultural Resources, Livestock Grazing and Forestry. Because they would receive no adverse impacts in addition to those described for the proposed action, no mitigating measures are shown for Climate, Geologic Setting, Topography, Water Resources, Vegetation, Paleontology and Socio-Economics. Adverse impacts on Air Quality, Soils, Visual Resources and Recreation could not be mitigated. Unavoidable adverse impacts are analyzed for Soils, Wildlife, Cultural Resources, Visual Resources, Recreation, Livestock Grazing and Forestry. (Only major adverse impacts are analyzed as unavoidable.)

Adverse Impacts That Cannot Be Avoided

This section presents an analysis of the unavoidable adverse impacts which would result from implementation of the forage maximization alternative. These impacts are those unavoidable adverse impacts which could not be mitigated if the alternative is implemented.

Impacts resulting from the grazing system, project construction and ungrazed allotments would be the same as described under the proposed action. The reader is directed to Chapters III, IV and V for a discussion of Impacts, Mitigating Measures and Adverse Impacts that cannot be avoided, resulting from these sources. This section discusses only those unavoidable adverse impacts resulting from additional vegetative manipulation.

The following resources have no adverse unavoidable impacts: Climate, Air Quality, Geologic Setting, Topography, Water Resources, Vegetation, Paleontology, Mineral Resources, Transportation Networks and Socio-Economics. Numbers preceding impacts are the same as used in previous sections of this alternative.

Soils

2. SOIL CONTAMINATION

Short-term soil contamination would result on 3,500 acres of land due to vegetative manipulation spraying projects. This impact would be unavoidable.

Wildlife

7. DECREASED DIVERSITY IN WILDLIFE SPECIES

Some degree of wildlife species composition and community structure changes resulting from the conversion of pinyon-juniper and brush to grassland would be unavoidable. The mitigating measure of providing islands and strips of untreated areas at treatment locations would not be complete.

Table VIII-26

MITIGATING MEASURES
FORAGE MAXIMIZATION ALTERNATIVE

Impacts	Mitigating Measures	Reduction Due To Mitigation
WILDLIFE		
7. Decreased diversity in wildlife species.	7. Restrict mechanical forms of treatment to less than 100 yards in width to improve edge and reduce the effect of manipulation, and provide protected islands of brush or trees on burned areas.	7. Although the reduction due to mitigation cannot be quantified, the impact of decreased species diversity would be minimized.
CULTURAL RESOURCES		
10. Disturbance of Cultural Resources.	10. Design the mitigation studies as a single cultural resource project, similar to those used to salvage cultural values from impacts of reservoirs and strip mine areas.	10. Mitigation would result in a large, short-term gain in cultural resource information and the irreversible and irretrievable commitment of most of the research potential of the area on the disturbed sites.
LIVESTOCK GRAZING		
14. Non-use following vegetative manipulation.	14. Schedule vegetative manipulation so a portion of the non-use required is during a scheduled rest period.	14. The mitigation would not change the requirement that AUMs would be removed from treated areas but would lessen the effect by scheduling required non-use during a portion of the normal rest period.
FORESTRY		
15. Ponderosa Pine Damage	15. Build fire lines around ponderosa pine stands.	15. The potential for damage would be reduced, but not eliminated. The amount of reduction in impact is not measurable with available data.
	15. Hand-cut pinyon-juniper that is intermixed with ponderosa pine when performing chaining operations.	15. The potential damage to ponderosa pine from chaining would be eliminated.
	15. Limit the acreage chained to less than 2,000 acres per year.	15. This would not reduce damage to ponderosa pine, but would allow damaged material to be salvaged and marketed.
	15. Delay burning the chained areas for at least five years after chaining.	15. The fuel would be reduced, making fires easier to control.

Source: Compiled by BLM Resource Specialists

8. WILDLIFE DISTURBANCE

During mechanical vegetative manipulation which has to be done in the spring period to achieve maximum results, the disturbance of active nests and young animals would be unavoidable.

9. INVERTEBRATE DISTURBANCE

The destruction and short-term forced movement of invertebrates would be unavoidable during vegetative manipulation.

Cultural Resources

10. DISTURBANCE OF CULTURAL RESOURCES

Salvage to protect cultural resources from vegetative manipulation operations would result in an unavoidable loss of cultural resources information potential.

Visual Resources

11. INCREASED CONTRAST

Unavoidable adverse impacts on visual resources due to vegetative treatment would be similar to those under the proposed action, except to a greater degree (15 percent undergoing vegetative manipulation as opposed to less than one percent in the proposed action).

Livestock Grazing

14. NON-USE FOLLOWING VEGETATIVE MANIPULATION

The treatments which cannot be scheduled to coincide with normal rest or in which the rest periods are not long enough to take in all the required non-use, would require a reduction in AUMs following treatment. This reduction would be an unavoidable adverse impact. It is not known how much treatment can be scheduled to coincide with normal rest periods and thus reduce these required non-use periods.

Forestry

15. PONDEROSA PINE DAMAGE

The potential damage to ponderosa pine resulting from burning would continue and could not be avoided.

17. REDUCED FIREWOOD AVAILABILITY

A long-term reduction in available pinyon-juniper firewood would be unavoidable under this alternative.

Pasture Level Stocking

Description

Under the pasture level stocking alternative, the same grazing systems would be used as outlined in the proposed action. Its implementation would entail the following:

1. The pasture level stocking alternative would be initiated by stocking each allotment so that the grazed pastures would be used at 50 percent utilization of key forage species for grazing animals. The proposed action would initially stock pastures at 60 to 67 percent use of key forage species for grazing animals. AUMs authorized under the pasture level stocking alternative would be the AUMs available in individual use pastures each year. See Table VIII-27 for AUMs by allotment. A total of fifty-nine allotments would be affected, with a reduction of 19,473 AUMs from current active AUMs available (57,611). While there would be 50 percent use of key forage species for both the alternative and the proposed action by the year 2000, this level would be reached immediately with pasture level stocking. Under the proposed action 50 percent use of key forage species would occur at the end of the first or second grazing cycles of the grazing system.
2. Intensive grazing management on 57 allotments would occur as in the proposed action.
3. Range improvements would be the same as under the proposed action.
4. There would be a continuation of other management functions for timber, wildlife, minerals, recreation, and other non-grazing resources.
5. Trespass action and crossing permits would be handled as in the existing environment.
6. The need for easements would be the same as in the proposed action.

Table VIII-28 shows the environmental impacts of the pasture level stocking alternative. To aid in tracking, impacts have been numbered consecutively. Table VIII-28 summarizes these numbered impacts by resource. In addition Table VIII-28 displays; (1) whether the impact is partially or totally mitigated by mitigating measures, (2) whether the impact (or part of the impact) is analyzed as an unavoidable adverse impact. Table VIII-29 summarizes the impacts by allotment.

Under pasture level stocking, the impacts resulting from the construction and physical presence of range improvements, vegetative manipulation and ungrazed pastures would be the same as described under the proposed action. The grazing systems specified in the description of the proposed action (Chapter I) would also be implemented under this alternative; however, the initial livestock stocking level would be reduced 19,473 AUMs. Stocking levels by 2000 would be the same as the proposed action (50 percent use of key forage species). Impacts discussed below are, therefore, limited to those resulting from this reduced stocking rate. For a complete analysis of

Table VIII-27

PASTURE LEVEL STOCKING ALTERNATIVE

Proposed Stocking

Allotment	No.[a]	Grazing Privilege AUMs[b]	1975 Resource Inventory AUMs	Wildlife AUMs Reserved	Livestock AUMs Available Under Proposal	Livestock AUMs Available At Pasture Level Stocking
Corrales Tierra	55	120	74	6	68	68[c]
Senorito	19	152	102	6	96	96[c]
Mesa Portales	17	376	350	20	330	330[d]
Nacimiento	14	302	242	18	224	224[d]
Ridge Top	24	231	205	2	203	203[d]
Salado-Tapia	51	480	290	12	278	278[d]
Arroyo Alamito	45	504	750	12	738	477
Arroyo Piedra Parada	54	518	462	24	438	328
Cachulie	39	1,512	1,743	150	1,593	960
Cebo Community	33	1,135	1,338	30	1,308	872
Coal Creek	29	1,010	668	27	641	427
El Banquito	49	1,836	1,674	111	1,563	1,172
Fork Rock Mesa	16	118	66	1	65	43
Forty-four	18	438	499	10	489	326
Gypsum Hill	61	480	282	20	262	175
Lagunitas	12	144	171	12	159	107
Ojo de los Pinos	8	1,017	1,029	34	995	660
Pelon	3	1,197	804	11	793	398
San Pablo	20	431	460	60	400	300
Shroyer	2	743	755	12	743	495
Arroyo Empedrado	36	601	490	18	472	354
Azabache	42	2,587	2,111	30	2,081	1,561
Banco de la Casa	52	653	524	25	499	374
Cabezon Peak	44	2,005	1,557	34	1,523	1,371
Canon del Camino	53	904	497	37	460	345
Cerro Cuate	41	488	436	24	412	309
Cucho Arroyo	57	408	436	16	420	315
Dry Well	27	1,544	1,025	12	1,013	760
Horn Arroyo	9	780	667	12	655	491
Lost Valley	40	1,853	2,508	150	2,358	1,769
Mesa Cortada	48	576	628	23	605	454

(continued)

Table VIII-27 (continued)

Allotment	No.[a]	Grazing Privilege AUMs[b]	1975 Resource Inventory AUMs	Wildlife AUMs Reserved	Livestock AUMs Available Under Proposal	Livestock AUMs Available At Pasture Level Stocking
North San Luis Mesa	37	688	556	34	522	360
Pipeline	56	1,425	1,831	83	1,748	1,310
Rio Salado Community	59	745	802	30	772	579
Rock House	60	778	1,006	30	976	731
San Luis Community	38	792	916	19	897	672
San Ysidro Pasture	46	876	756	12	744	558
Valle San Isidro	15	728	314	16	298	224
Chico Crossing	43	2,131	1,740	185	1,555	1,223
Continental Divide	1	1,732	1,594	84	1,510	1,208
Dry Springs	5	850	837	17	820	656
Eagle Mesa	23	1,634	1,664	36	1,628	1,303
Guadalupe Community	47	792	717	24	693	416
Penistaja	11	3,677	3,191	47	3,144	2,207
Piedra Lumbre	28	789	673	52	621	341
Torreon Wash	35	642	630	36	594	475
Twin Butte	34	1,660	961	40	921	554
Brandy	10	3,602	3,355	140	3,215	2,115
Starr	4	1,788	1,534	20	1,514	1,009
Ignacio Chavez Grant	50	2,621	3,928	1,084	2,844	2,438
Chiuilla Community	7	1,828	1,924	96	1,828	1,340
Elk Springs	30	242	267	99	168	168[e]
Mighty Mite	58	120	130	5	125	125[e]
Tres Hermanos	6	543	687	30	657	657[e]
Canada Candalaria	31	920	663	27	636	636[e]
Los Pinos Arroyo	26	195	176	75	101	101[e]

(continued)

Table VIII-27 (continued)

Allotment	No.[a]	Grazing Privilege AUMs[b]	1975 Resource Inventory AUMs	Wildlife AUMs Reserved	Livestock AUMs Available Under Proposal	Livestock AUMs Available At Pasture Level Stocking
Cerro Colorados	32	1,284	573	33	540	540[e]
Bama	21	0	7	7	0	0[f]
Molino	13	12	5	5	0	0[f]
Rock Ridge	25	35	17	17	0	0[f]
San Miguel	22	12	6	6	0	0[f]
TOTALS		58,225	54,268	3,313	50,955	37,988

Source: AMP Files for the Proposed Action

a. Allotments have been numbered as they occur in the area from north to south. See Visual A in back pocket.
b. Privileges established according to BLM grazing regulations prior to 1975 Resource Inventory.
c. AUMs are same as proposed action. These allotments are one pasture rest rotation systems where livestock are completely removed for a year's time (either every other year or every third year).
d. AUMs are same as proposed action. These allotments are two pasture rest rotation systems where livestock are completely removed for a year's time (either every other year or every third year).
e. AUMs are same as proposed action. These allotments are deferred rotation systems.
f. AUMs are same as proposed action. No livestock use.

Table VIII-28

SUMMARY OF ANTICIPATED IMPACTS BY RESOURCE

Pasture Level Stocking Alternative

Resource	Source of Impact	Impact		Magnitude of Impact		Mitigating Measures	Unavoidable Adverse Impacts
Soils	Pasture Level Stocking	1	Reduced Sediment Yield	Area-wide long-term	+	No	No
Vegetation	Pasture Level Stocking	2	Improved Vegetative Response	Area-wide long-term	+	No	No
Wildlife	Pasture Level Stocking	3	Increased Waterfowl Use	Area-wide long-term	+	No	No
		4	Improvement of Big Game Habitat	Area-wide long-term	+	No	No
		5	Game Bird Habitat	Area-wide long-term	±	No	No
		6	Improved Habitat for Small Birds and Mammals	Area-wide long-term	+	No	No
		7	Improved Predator Habitat	Area-wide long-term	+	No	No
Visual Resources	Pasture Level Stocking	8	Reduced Contrast	Area-wide long-term	+	No	No
Recreation	Pasture Level Stocking	9	Increased Recreational Use	Area-wide long-term	+	No	No
Livestock Grazing	Pasture Level Stocking	10	Initial Reduction of Livestock AUMs	Area-wide short-term	-	No	Yes
Forestry	Pasture Level Stocking	11	Improved Forestry Resources	Localized long-term	+	No	No
Socio-Economics	Pasture Level Stocking	12	Initial Reduction of Livestock AUMs	Area-wide short-term	-	No	Yes
		13	Ranches Out of Business	Area-wide long-term	-	No	Yes

+ Positive Impact
- Negative Impact

Source: Summarization of Pasture Level Stocking Alternative

Table VIII-29

SUMMARY OF IMPACTS BY ALLOTMENT

Pasture Level Stocking Alternative

Allotment Name	Allot. No.	Impact Number 1	2	3	4	5	6	7	8	9	10	11	12
Corrales Tierra	55										X		X
Senorito	19										X		X
Mesa Portales	17										X		X
Nacimiento	14										X		X
Ridge Top	24										X		X
Salado-Tapia	51										X		X
Arroyo Alamito	45	X	X	X	X	X	X	X	X	X	X		X
Arroyo Piedra Parada	54	X	X	X	X	X	X	X	X	X	X		X
Cachulie	39	X	X	X	X	X	X	X	X	X	X		X
Cebo Community	33	X	X	X	X	X	X	X	X	X	X		X
Coal Creek	29	X	X	X	X	X	X	X	X	X	X		X
El Banquito	49	X	X	X	X	X	X	X	X	X	X	X	X
Fork Rock Mesa	16	X	X	X	X	X	X	X	X	X	X		X
Forty-four	18	X	X	X	X	X	X	X	X	X	X		X
Gypsum Hill	61	X	X	X	X	X	X	X	X	X	X		X
Lagunitas	12	X	X	X	X	X	X	X	X	X	X		X
Ojo de los Pinos	8	X	X	X	X	X	X	X	X	X	X		X
Pelon	3	X	X	X	X	X	X	X	X	X	X		X
San Pablo	20	X	X	X	X	X	X	X	X	X	X		X
Shroyer	2	X	X	X	X	X	X	X	X	X	X		X
Arroyo Empedrado	36	X	X	X	X	X	X	X	X	X	X		X
Azabache	42	X	X	X	X	X	X	X	X	X	X		X
Banco de la Casa	52	X	X		X	X	X	X	X	X	X		X
Cabezon Peak	44	X	X	X	X	X	X	X	X	X	X		X
Canon del Camino	53	X	X	X	X	X	X	X	X	X	X		X
Cerro Cuate	41	X	X	X	X	X	X	X	X	X	X		X
Cucho Arroyo	57	X	X	X	X	X	X	X	X	X	X		X
Dry Well	27	X	X	X	X	X	X	X	X	X	X		X
Horn Arroyo	9	X	X	X	X	X	X	X	X	X	X		X
Lost Valley	40	X	X	X	X	X	X	X	X	X	X		X
Mesa Cortada	48	X	X		X	X	X	X	X	X	X		X
North San Luis Mesa	37	X	X	X	X	X	X	X	X	X	X		X
Pipeline	56	X	X	X	X	X	X	X	X	X	X		X
Rio Salado Community	59	X	X	X	X	X	X	X	X	X	X		X
Rock House	60	X	X	X	X	X	X	X	X	X	X		X
San Luis Community	38	X	X	X	X	X	X	X	X	X	X		X
San Ysidro Pasture	46	X	X	X	X	X	X	X	X	X	X		X
Valle San Isidro	15	X	X	X	X	X	X	X	X	X	X		X
Chico Crossing	43	X	X	X	X	X	X	X	X	X	X		X
Continental Divide	1	X	X	X	X	X	X	X	X	X	X	X	X
Dry Springs	5	X	X	X	X	X	X	X	X	X	X		X
Eagle Mesa	23	X	X	X	X	X	X	X	X	X	X		X
Guadalupe Community	47	X	X	X	X	X	X	X	X	X	X		X
Penistaja	11	X	X	X	X	X	X	X	X	X	X		X
Piedra Lumbre	28	X	X	X	X	X	X	X	X	X	X		X
Torreon Wash	35	X	X	X	X	X	X	X	X	X	X		X
Twin Butte	34	X	X	X	X	X	X	X	X	X	X		X
Brandy	10	X	X	X	X	X	X	X	X	X	X		X
Starr	4	X	X	X	X	X	X	X	X	X	X	X	X
Ignacio Chavez Grant	50	X	X	X	X	X	X	X	X	X	X	X	X
Chiuilla Community	7	X	X	X	X	X	X	X	X	X	X	X	X
Elk Springs	30										X		X
Mighty Mite	58												
Tres Hermanos	6										X		X
Canada Candelaria	31										X		X
Los Pinos Arroyo	26										X		X
Cerro Colorados	32										X		X
Bama	21												
Molino	13										X		X
Rock Ridge	25										X		X
San Miguel	22										X		X

Source: Summarized from description of the Pasture Level Stocking Alternative and Impacts

impacts under this alternative, the reader is also referred to Chapter III, Impacts of the Proposed Action.

Impacts on Climate, Air Quality, Geologic Setting, Topography, Water Resources, Cultural Resources, Paleontology, Mineral Resources and Transportation Networks occurring under this alternative would be the same as those described in Chapter III, Impacts of the Proposed Action.

Impact Analysis

Soils

Source of Impact: Pasture Level Stocking

1. REDUCED SEDIMENT YIELD

With this overall reduction of livestock grazing pressure, there would be increased vegetative cover and litter left on the ground. This would cause a short-term decrease in sediment yield; however, long-term sediment yields would not be measurably different than those anticipated under the proposed action. The reduced sediment yield would be an area-wide, long-term, beneficial impact.

Vegetation

Source of Impact: Pasture Level Stocking

2. IMPROVED VEGETATIVE RESPONSE

Under the pasture level stocking alternative, vegetation would respond to the lower levels of livestock use. Plants would produce and maintain a higher level of food reserves, vigor would develop more quickly, and production in succeeding years would increase more quickly. The level attained by the year 2000 would be the same as the proposal, but would be reached by approximately 1995. The improvement in vegetation would be a short-term effect, as compared with the proposal. Vegetative species would respond as previously described in Chapter II-B, Areas With AMPs. Compared with the existing environment, improved vegetative response would be an area-wide, long-term, beneficial impact.

Wildlife

Source of Impact: Pasture Level Stocking

3. INCREASED WATERFOWL USE

Impacts on waterfowl and shorebird use resulting from livestock concentration would be somewhat reduced in the short-term because of reduced livestock density. It is estimated that differences in impacts between the alternative and the proposed action resulting from livestock concentrations at water sources would not be discernible. Over the long-term, the impacts would be identical to the proposal. Compared with the existing environment, increased waterfowl use would be an area-wide, long-term, beneficial impact.

4. IMPROVEMENT OF BIG GAME HABITAT

Reductions in livestock numbers (19,121 AUMs) under the pasture level stocking alternative would provide additional forage for wildlife, and competition between livestock and big game would be reduced. Elk, deer and antelope would be provided additional (or improved) habitat, in proportion to the livestock reductions and degree of actual competition. Provided that populations are not limited by factors unrelated to livestock use, big game populations would expand at a more rapid rate than is anticipated under the proposed action. Habitat conditions in the long-term, however, would be as described under the proposed action.

Elk would benefit from the lower stocking rate on both summer and winter range. Reductions of 589 livestock AUMs (from the current active AUMs) on the El Banquito allotment would increase available forage for the area's only resident elk herd. Considering that the dietary overlap between the two species is relatively high (25 to 35 percent) during this season, this reduction would be particularly beneficial. It is important to note, however, that not all of the allotment is usable as elk range and that livestock would be on the range during summer only about one half of the time.

The winter elk herds in the ES Area would also improve as a result of a reduction in 408 livestock AUMs on the Ignacio Chavez Grant, Los Pinos Arroyo and San Pablo allotments from the current active AUMs. Some competition would still exist because of the presence of deer and livestock on these areas, but the additional forage provided would allow for a potential expansion at an increased rate, if compared to the proposed action. In the long-term, habitat conditions would be the same as under the proposed action.

Additional forage for deer, resulting from a 19,121 reduction in livestock AUMs throughout their range, would allow the species to better utilize its habitat and build healthier populations. This would allow for potential population expansions at an earlier point in time than under the proposed action. Overall deer densities by 2000 would not differ from the proposed action.

Antelope would also benefit under the alternative, as a result of reduced competition and increased food availability. This would be particularly beneficial during spring and summer when competition for grasses and forbs is highest and of relatively less benefit during winter when antelope turn to browse. Assuming that the average year-round similarity in diets is 25 percent (see Figure II-11), the alternative would provide food needs for faster build up of the population. The extent to which antelope would take advantage of this increase in forage would depend on their willingness to utilize grazed pastures.

The improvement in big game habitat would be an area-wide, long-term, beneficial impact.

5. GAME BIRD HABITAT

Impacts on turkeys, quail and mourning doves would be that the effects of livestock disturbances would be reduced in the short-term. The probability of nest destruction would decline approximately 25 percent over the short-term. This would not significantly alter populations, however, because renesting following such disturbances is common among these species. While food availability would be increased, it is anticipated that food would be least limiting under this alternative (excess food would be produced). Reduced livestock activity would increase cover, but would also reduce potential edge. Considering the compensatory effect of adverse and beneficial impacts, and the influence of other limiting factors on populations, it is estimated that the net long-term effect on upland game birds under this alternative would be identical to the proposed action.

This change in game bird habitat would be both an area-wide, long-term, beneficial or adverse impact, depending upon the species affected.

6. IMPROVED HABITAT FOR SMALL BIRDS AND MAMMALS

Forage increases would be beneficial to most small herbivores and passerine birds. Rabbits, hares, rodents and a variety of seed eating and insectivorous birds would take advantage of additional food and cover, and would expand their populations. This response would occur earlier than anticipated under the proposal and peak densities would be realized sooner. Densities by the year 2000 would be the same as under the proposed action. This would be an area-wide, long-term, beneficial impact.

7. IMPROVED PREDATOR HABITAT

Increases in small birds and mammals would, in turn, increase food for raptors and mammalian predators. Although overall densities by the year 2000 would be the same under this alternative as the proposed action, peak densities would be achieved at an earlier point in time. This would be an area-wide, long-term, beneficial impact.

Visual Resources

Source of Impact: Pasture Level Stocking

8. REDUCED CONTRAST

Visual impacts of this alternative would be the same as that of the proposed action with regard to the range improvements. The reduced stocking rate would decrease visual contrast during the short-term and the visual impacts associated with pasture development would be reduced. Because the vegetation in the use pastures would be more vigorous than under the proposed action during this time, fence line contrast between rest and use pastures would be less noticable. Over the long-term visual impacts would be the same as those described in the proposed action. This would be an area-wide, long-term, beneficial impact.

Recreation

Source of Impact: Pasture Level Stocking

9. INCREASED RECREATIONAL USE

Improved visual resources and increased wildlife would have a beneficial impact on sightseeing and hunting use. This use would expand at an accelerated rate compared with that anticipated from the proposed action. By the year 2000 recreational use would be the same as under the proposed action. This would be an area-wide, long-term, beneficial impact.

Livestock Grazing

Source of Impact: Pasture Level Stocking

10. INITIAL REDUCTION OF LIVESTOCK AUMs

With this alternative, 59 allotments would be reduced 19,121 AUMs from the current active AUMs. This initial reduction in livestock numbers allowed on the public lands would increase licensee hardships as they sell portions of their herds. Several ranchers may be forced out of business. Trespass actions by BLM would probably increase, as many licensees attempt to keep their livestock. This would be an area-wide, short-term, adverse impact. By the year 2000, the total annual AUMs for livestock use on public lands would be the same as that of the proposed action.

Forestry

Source of Impact: Pasture Level Stocking

11. IMPROVED FORESTRY RESOURCES

Under the pasture level stocking alternative, the impacts of vegetative competition on ponderosa pine would be realized more immediately than they would with the proposed action. Trampling and rubbing damage would be decreased during the short-term. By the year 2000, these localized impacts would be the same as the proposed action.

Socio-Economics

Source of Impact: Pasture Level Stocking

12. INITIAL REDUCTION OF LIVESTOCK AUMS

Under this alternative an immediate reduction in AUMs would result in reductions in the size of ranch operations. The existing 84 ranches classified as subsistence would increase to 102; 42 small ranches would decline to 24; and the eight medium ranches would remain unchanged. The short-term effect would be a loss of $133,847 in receipts per year. This would be an area-wide, short-term, adverse impact. Over the long-term, AUMs for livestock use would be expected to increase to 91,149 and the dollar value of receipts would increase to $2,716,080.

13. RANCHES OUT OF BUSINESS

A number of ranches would go out of business due to increased losses; however, the number of ranches cannot be determined with available data. This would be an area-wide, long-term, adverse impact. If no ranch went out of business, ranch sizes would eventually increase as under the proposed action.

Mitigating Measures

No Mitigating measures are shown for the pasture level stocking alternative. Adverse impacts in addition to those anticipated for the proposed action, affect Wildlife, Recreation, Livestock Grazing, and Socio-Economics. These adverse impacts could not be mitigated. Unavoidable adverse impacts are shown for Livestock Grazing and Socio-Economics. Only major adverse impacts are analyzed as unavoidable.

Adverse Impacts That Cannot Be Avoided

This section presents an analysis of the unavoidable adverse impacts which would result from implementation of the pasture level stocking alternative. These impacts are those adverse impacts which could not be mitigated if the alternative is implemented.

No unavoidable adverse impacts are analyzed for Climate, Air Quality, Geologic Setting, Topography, Soils, Water Resources, Vegetation, Wildlife, Cultural Resources, Paleontology, Visual Resources, Recreation, Mineral Resources, Forestry, and Transportation Networks. (Only major adverse impacts are analyzed as unavoidable.) Numbers preceding impacts are the same numbers used to identify impacts in previous sections of the alternative.

Livestock Grazing

10. INITIAL REDUCTION OF LIVESTOCK AUMS

Fifty-nine allotments would undergo an initial reduction in livestock numbers. As a result of reduced AUMs, current active use AUMs would be reduced from 57,109 to 37,988. The overall reduction in AUMs would be 19,121 and would be unavoidable.

Socio-Economics

12,13. INITIAL REDUCTION OF LIVESTOCK AUMS, RANCHES OUT OF BUSINESS

Reductions in AUMs under this alternative would affect 99 percent of ranch operations in the Rio Puerco ES Area. The ranching community would experience a total reduction of 19,121 AUMs (a reduction of approximately 1,593 head of livestock). Based on an 70 percent calf crop, this would mean a reduction of 1,115 calves, at a weaning weight of 400 pounds. Considering an average price of 30 cents per pound for calves, the total short-term loss to the livestock industry from calf production would be $133,847 per year. This would force operators to depend more completely on non-ranching sources of income for their family livelihood.

The average AUM reduction for each ranch unit would amount to approximately $1,014 loss of family income.

Chapter IX

Consultation and Coordination

CHAPTER IX
CONSULTATION AND COORDINATION

This chapter addresses the consultation and coordination procedures involved in preparing and presenting this BLM proposal. Included are the organization of the team, preparing the Environmental Statement, the various agency contacts, the significant meetings and list of individuals and organizations that will receive a copy of the draft ES along with a request to submit written comments. Written comments from other interested parties are also considered.

Organization of Team for Preparation of the Draft ES

On February 2, 1976 the Rio Puerco ES team was assembled in Albuquerque, New Mexico. Four days of instruction and guidance on ES preparation procedures and a field trip through the ES Area were provided during the first week. The team consisted of BLM resource specialists from the New Mexico State Office and the Albuquerque District Office. Team members included specialists representing a broad spectrum of resources: vegetation, soils, hydrology, wildlife, livestock, forestry, cultural resources, visual resources, recreation, watershed, minerals and socio-economics. The project manager, team leader, technical coordinator, technical editor, engineering technician, typists and draftsmen provided support, guidance and coordination for the effort.

The team worked in office space adjacent to the District Office to facilitate use of district files and copying equipment. Periodic review was provided by the BLM staff in the Washington Office, Denver Service Center and New Mexico State Office.

Consultation and Coordination in Preparation of the Draft ES

During preparation of the Draft, other state and federal agencies as well as universities with special expertise relating to the proposed action were contacted for information. Records of personal contacts and telephone contacts are on file in the Albuquerque District Office. Prior to preparing the Draft ES, BLM entered into fourteen contracts to gather needed information. Contractors included four universities (Eastern New Mexico University, New Mexico State University, University of New Mexico and Texas Tech University), as well as private organizations and other federal agencies. The U.S. Fish and Wildlife Service and the New Mexico State Game and Fish Department provided data on wildlife under an interagency agreement (Appendix IX-1).

The New Mexico State Office sent out a news release in August 1975, describing the grazing environmental statements. This was followed by letters in September and October from the Albuquerque District Office to the grazing licensees informing them how they would be affected and asking them for information, assistance and cooperation. In April and June, 1976, letters were sent out to a broad spectrum of resource users, groups, individuals and agencies, describing the Rio Puerco ES and requesting information, opinions, and suggestions on preparation of the ES. Follow-up letters were sent out in August and December, 1976, to keep the users and public informed of progress on the ES. The Albuquerque Journal published two feature articles describing allotment management plans and the Rio Puerco Environmental Statement. Personnel from the New Mexico State Office and the Albuquerque District Office have conducted tours for the District Advisory Board, the Interagency Range Committee and interested contractors to keep these groups informed and to give them a firsthand look at the area. These efforts to obtain a wide spectrum of input resulted in the following comments from individuals, organizations, and federal and state agencies.

Central New Mexico Audubon Society

Robert C. Tost

Comments: Requested additional information for a subsequent written response and indicated the need for a sound, balanced wildlife interest.

Continental Oil Company

C. Ted Clark

Comments: Provided information on oil and gas, coal, and metalic deposits that underlie the area and indicated that multiple use concepts should be recognized to allow both mineral exploration and development as well as grazing.

Kerr-McGee

D. E. Smouse

Comments: The Grants Uranium belt, which contains about 40 percent of the nation's domestic uranium production, extends into the ES Area. An explanation of geology in the area and exploration methods was presented. Water wells commonly drilled for exploration purposes are made available to local ranchers as sources of livestock water. Approximately one quarter of the projected uranium exploration in New Mexico is expected to be in the Rio Puerco ES Area.

New Mexico Conservation Coordinating Council

Dale A. Jones

Comments: The Council offered to arrange meetings with member organizations, agency staff and interested citizens to discuss issues that need public attention. They published an article in their newsletter, 'Environmental News,' explaining the Rio Puerco ES and requesting public input and involvement.

Sohio Petroleum Company

L. C. Jacobsen

Comments: The Sohio Petroleum Company offered to loan to BLM the Environmental Statement prepared for its license application for a uranium mill on the L Bar Ranch. Information in the ES could be utilized in the draft Rio Puerco ES.

Mr. Rudy Velarde

Cuba, New Mexico

Comments: Mr. Velarde suggested that the effects of predation by coyotes be considered and that predator control programs be allowed to reduce livestock losses. Livestock grazing should continue to be used on federal ranges to convert grass to beef. Priority should be given to improving the forage capacity of allotments permitted to people in the low-income brackets.

The Wilderness Society

Dave Foreman

Comments: The Wilderness Society expressed an interest in maintaining the primitive character of the wild portion of the Ignacio Chavez Grant (Mesa Chivato) that lies adjacent to the Forest Service Guadalupe Wilderness Study Area. The adjacent portion of the Ignacio Chavez Grant should be considered for designation as a Primitive Area.

Mr. James V. Lewis

Albuquerque, New Mexico

Comments: Mr. Lewis referred to the Rio Puerco area as being greatly overgrazed. To ensure any future forage for livestock, wildlife and watershed, stocking rates must be limited sharply to allow the area to recover. The valley bottoms should be put under management first.

Mr. Heister Drum

Albuquerque, New Mexico

Comments: The Cabezon area is fragile and travel by off road vehicles has contributed to erosion and destruction of vegetation. Increased erosion and head cut arroyos contribute to filling the Jemez Flood Control Dam with silt.

In April 1976, a letter was sent to all agencies with possible jurisdictional responsibility or related expertise asking them to inform us of the nature of their jurisdictional responsibility. The following comments were received:

Environmental Improvement Agency (EIA)

Kenneth M. Hargis

Comments: The EIA provided a copy of the Ambient Air Quality Standards for the State of New Mexico.

U. S. Forest Service, Santa Fe National Forest

Christobal B. Zamora

Comments: The Santa Fe National Forest has permittees that graze on National Forest Lands in the summer and on public lands in the *winter. Coordination of grazing management is essential for environmental protection as well as for the socio-economic impact on permittees who have both BLM and Forest Service grazing permits. The Forest Service had identified serious overgrazing problems on the Cuba Ranger District and are planning to implement grazing management systems and adjustments in permitted livestock by 1985. Since many of their permittees are also BLM permittees, adjustments in permitted numbers of livestock by either agency affect the permittees' grazing operation and the other agency.*

New Mexico State Highway Department

R. L. Brammer

Comments: Better forage management on public lands adjacent to highway rights-of-way could reduce the encroachment of livestock and wildlife onto highway corridors by providing quality forage on the adjacent lands. This would reduce the frequency of vehicle-animal accidents on highways where animals graze on the highway rights-of-way

Soil Conservation Service (SCS)

A. W. Hamelstrom

Comments: The SCS recommended we allocate uses of the land proportionate to the potential production and capabilities of the land. They suggest that we improve the lands with greater potential first, to carry the grazing load while the poorer lands slowly improve. This criteria would set the priority of fencing, water and management systems. Reduction of sediment due to non-point source should receive priority. The SCS would like to jointly monitor the effects of range management systems and facilities on game and non-game wildlife.

State Engineers Office

Santa Fe, New Mexico

Comments: The State Engineer's Office provided a copy of Rules and Regulations manuals for surface and ground water resources.

State Planning Office

Kate Wickes

Comments: The State Planning Office has no jurisdictional responsibilities in any phase of livestock grazing and has no programs that would be affected.

The State Historic Preservation Officer (SHPO) was contacted several times during preparation of the draft statement. Cultural resource information gathered for the preparation of the statement, impact analysis and proposed mitigating measures were delivered to the SHPO for preliminary review. In a letter dated September 7, 1976, he indicated the general concurrence with the proposed mitigating measures. He further indicated that although general types of impacts can be described in the statement, the design constraints described in Chapter I are needed to ensure the protection of cultural resources. These procedures would allow the analysis of specific impacts on cultural resources when the location of projects are known with greater precision than is possible at this time (see Appendix IX-2 for letter from the State Historic Preservation officer).

The Fish and Wildlife Service (FWS) was contacted prior to preparation of the draft to assemble information on any threatened or endangered species in the area. Under an interagency agreement, they inventoried blackfooted ferret habitat in the area and concluded that no ferrets occupied the area at this time. Further, they indicated that prairie dog towns in the area were inappropriate for ferret reintroduction sites. (Source: Blackfooted Ferret Investigators, BLM Impact Statement Area, FWS). No other threatened or endangered species were identified.

Open meetings were held in December 1975, in Cuba and Albuquerque, New Mexico, to present background information on the proposed AUMs and the Rio Puerco Environmental Statement.

In the spring and summer of 1976, grazing users of the public lands in the Rio Puerco ES area were invited on an allotment basis to meet with BLM employees to explain how their allotment would be affected by the proposal (proposed combinations, grazing systems and changes in numbers of livestock).

In March of 1977, a series of public meetings was held to inform interested groups about the impacts of the proposal and the draft ES. From March 1 through July 28, 860 people attended these meetings. Presentations were given for the following organizations: The Society for Range Management, New Mexico Cattle Growers' Association (the Public Lands and Forest Lands Committee), the New Mexico Conservation and Coordination Council, the Sierra Club, the New Mexico Farm and Livestock Bureau, Rio Puerco Livestock Users Association, the Rio Puerco Grazing Association, Southeastern New Mexico Grazing Association, New Mexico Department of Game and Fish, Audubon Society, San Juan Livestock Growers Association, and the Congressional Delegation Representatives.

Comments on the Draft Environmental Statement were requested from the following agencies, interest groups and individuals.

Department of Agriculture

Forest Service
Soil Conservation Service
Agricultural Stabilization and Conservation Service

Environmental Protection Agency

Department of the Interior

U.S. Fish and Wildlife Service
Bureau of Reclamation
Bureau of Outdoor Recreation
U. S. Geological Survey
Bureau of Mines
National Park Service
Bureau of Indian Affairs
Special Assistant to the Secretary

Department of the Army

Army Corps of Engineers

Advisory Council on Historic Preservation

New Mexico State Clearinghouse

New Mexico State Agencies

Office of the Governor
Game and Fish Department
State Engineer
State Historic Preservation Officer
State Land Office
State Planning Office
Environmental Improvement Agency
New Mexico State University
University of New Mexico
State Highway Department
Middle Rio Grande Council of Governments

Local Government

Sandoval County Commissioners
McKinley County Commissioners
Mayor, City of Bernalillo
Mayor, Village of Cuba
Mayor, Village of San Ysidro
Mayor, Village of La Jara

Conservation Organizations

New Mexico Conservation Coordination Council
Sierra Club
New Mexico Wildlife Federation
National Wildlife Federation
Natural Resources Defense Council
National Council of Public Land Users
Wildlife Management Institute
Central New Mexico Audubon Society
Wilderness Society
Ada County Fish and Game League
Friends of the Earth
Oregon Environmental Council
Nevada Outdoor Recreation Association

Livestock Organizations

Cuba Livestock Grazing Association
New Mexico Cattlegrowers Association
Rio Puerco Grazing Association

Professional Societies

Society for Range Management
Soil Conservation Society of America
Wildlife Society
Ecological Society

Other Groups

Texas Tech University
Southwest Research and Development Corporation

Individuals

James Morgan

A public hearing was held in Albuquerque, New Mexico in August 30, 1977. Details for the hearing were published in the Federal Register and local newspapers.

Public Comments on the Draft ES

A 45-day public comment period was provided to review and comment on the adequacy of the proposal and its alternatives. The Draft ES was filed with the Council on Environmental Quality on July 28, 1977 and released to the public. The notice of availability was published in the July 29, 1977 issue of the Federal Register on page 38655. The notice announced a 45-day public review period ending September 14, 1977 and included a schedule for public hearings in Albuquerque, New Mexico on August 30, 1977.

Over 700 copies of the draft were mailed to federal, state and local government agencies, non-government groups, and individuals for their review and comment. The Federal Register also listed locations of reading copies available for public review, and information on how to obtain a copy of the draft statement. In addition, a national news release was made from the Department of the Interior, Washington, D.C. on July 28, 1977. A similar news release was made from the Albuquerque District Office to media within New Mexico.

Public Hearings

The Department of the Interior conducted two sessions of formal hearings on the adequacy of the Draft Rio Puerco ES on August 30, 1977. Sessions were held at 1:00 p.m. and at 7:00 p.m. An Interior Department Administrative Law Judge presided over the hearings, which were recorded verbatim by professional court reporters. Copies of the full hearing transcript are available for review in the Albuquerque District Office. The hearing panel consisted of employees of the Bureau of Land Director, Santa Fe, New Mexico; Acting District Management, including New Mexico State Manager, Albuquerque, New Mexico; and Team Leader, Rio Puerco Environmental Statement, Albuquerque, New Mexico.

The following summarizes the hearing location, date and time, attendance and the number testifying:

Location	Time & Date	Attendance	Number Testifying
Albuquerque, New Mexico	8/30/77 1:00 p.m.	31	8
Albuquerque, New Mexico	8/30/77 7:00 p.m.	43	2

Handling of Public Comments and Review Procedures

All written comments and the hearing transcripts have been sent with the final environmental statement to the Secretary of the Interior and the Council on Environmental Quality. They are also available for inspection at the State Director's Office, Federal Building, Santa Fe, New Mexico; BLM District Office, Albuquerque, New Mexico; and BLM Office of Public Affairs, Washington, D.C.

All comments were reviewed and considered. Comments which present new data, question facts and/or analyses, and raise questions or issues bearing directly upon the environmental effects of the proposal and the alternatives were used in revising and text or were responded to. Comments not addressing the adequacy of the Draft ES were not responded to.

Although the public review period ended on September 14, 1977, all comments were addressed until October 7, 1977. Any letters received after October 7 are included herein but were not responded to.

Summary of Changes from Draft ES

Minor editorial and factual changes have been incorporated into this statement without acknowledgement in this section. One change made between the draft and final was a result of a recheck of the AUM tabulation from the Resource Inventory. AUM figures on sixteen of the proposed allotments were corrected as a result of this recheck.

Individuals Speaking at Public Meetings

August 30, 1977 -- Albuquerque, New Mexico

Index No.	Speaker (Representing)
1.	F. L. Marquez (Sandoval County Extension Service)
2.	Rudy Gutierrez (Rio Puerco Livestock Association, Rio Puerco Grazing Association and the New Mexico Public Lands Council)
3.	Jerry G. Schickedanz (New Mexico State University)
4.	Dr. James Gray (New Mexico State University)
5.	Bud Eppers (Southeastern New Mexico Grazing Association)
6.	Alice F. Wiese (Self and husband--rancher)
7.	Bill Smith (Self--rancher)
8.	Samuel H. Lamb (Self--Wildlife Representative, BLM Land Use Advisory Board)
9.	Phil Garcia (Rio Puerco Grazing Association)
10.	W. R. (Bill) Humphreys (First State Bank, Cuba, New Mexico)

Comments and Responses

1. Comment: How long will AUMs be in suspended non-use? What would be the impact on current grazing economics? (Commenter No. 1)

Response: Permanent increases will be granted (or suspended use restored to the forage production potential of the allotment) only after the grazing system has been through at least one cycle (e.g., if an allotment has three pastures, then one cycle will be completed in three years), and the allotment management plan has been evaluated to determine if management objectives are being accomplished.

Economic impact is expected to be quite substantial for those ranchers whose cattle numbers would be severely cut, although the overall economic loss in the area would be minimal.

2. Comment: The area that will be changed from livestock to wildlife implies that the producers would subsidize wildlife by being cut down on their animal units. (Commenter No. 1)

Response: The Code of Federal Regulations governing BLM's activities states in part that wildlife interests are to be considered and sufficient grazing capacity be reserved for the maintenance of a reasonable number of wildlife. This policy was followed in the Rio Puerco area. As stated in the ES (page III-62), this use of grazing AUMs by wildlife would result in an adverse impact on some licensees.

3. Comment: Fencing will also have an economic impact on these people. The proposal calls for changing fences to meet certain specifications as set forth in the regulations, which only means that the producers will have to share the cost of rebuilding these fences. (Commenters 1 and 2)

Response: New fences on antelope range or potential range will be built to one of the antelope range fence specifications. Where modifications to existing fences are required, they will be done at BLM expense. These modifications will be made where antelope management problems exist.

The BLM is currently undertaking a study in the Roswell area to identify problems associated with antelope fences.

Chapter II, page 35 of the ES has information on existing fences as they relate to antelope.

4. Comment: In the absence of data, the backlog of experience, historic know-how in range management, and expertise gained by those living in the area was never used. (Commenter No. 2)

Response: BLM staff undertook extensive interviews and other methods of acquiring local opinion and information in the early planning stages of the process. The following tools were used to obtain area input:

a. Written response to mailed inquiries;
b. Telephone conversations with a random sample of licensees;
c. Public meetings; and
d. Meetings with individuals regarding proposed Allotment Management Plans.

In addition, a detailed socioeconomic study was completed by James R. Gray and Burton C. English of New Mexico State University under contract to BLM. This document incorporated a great deal of local information.

Comment: Certain range practices used in the ES & AMPs are not consistent with proper range management.

a. Cattle should be dispersed rather than concentrated in use pastures; and
b. Grazing should conform to available forage rather than calendar dates. (Commenter No. 2)

Response: a. From the standpoint of livestock production, it may be better to allow the animals to graze continuously on one area or pasture. BLM is not, however, managing the range for livestock alone, but is trying to produce a high quality of sustained yield forage for many uses. Because of this, it is necessary to rotate the animals from pasture to pasture during the year to allow plants to meet their physiological requirements. Usually two or more pastures will be used during the year by livestock in our grazing systems.

b. Overall, our grazing systems are based on available forage and growth stages rather than calendar dates. As rested pastures are allowed to regain more and more vigor, old growth from these pastures should keep deviations to a minimum.

6. Comment: The ES draft does not give a justifiable reason for combining allotments other than ease in administration. There is a clear indication throughout the ES that there was no concern or consideration given to the emotions of people, the behavior of animals, the economic impact, or the impact on the land by man-created situations. (Commenter No. 2)

Response: There are several justifiable reasons for combining allotments, but ease in administration is not one of them. There were however, several considerations taken into account before allotments were proposed for combination. These are stated in the objectives section of Chapter I and include:

a. Interest of Resource Management--Presently a majority of the allotments are not cross-fenced and have yearlong use. In order to manage these lands in the interest of proper resource management, combining of allotments was proposed. Another alternative would be to change the use periods from yearlong to specific limited use periods. This would require the licensee to find additional grazing areas during the period of rest for the allotment.

b. Economics--Each AMP had to arrive at a benefit-cost ratio approaching one to one. Chapter I summarizes the ratios of the area. The determining factor on many of the allotments was the number of projects completed at this point and the number of new projects needed to implement an AMP.

c. Environmental Considerations--The Rio Puerco ES area has many existing improvements on public lands, including over 500 miles of fence. For each new improvement project, a portion of the environment is affected. The environmental impacts resulting from maintaining individual allotments would be greater than those shown in Chapter III of the proposed action.

7. Comment: In Objective One of the ES, what environmental considerations were involved in combining allotments? (Commenter No. 2)

Response: See response to comment number 6 (part c).

8. Comment: In Objective Two, the ES implies that forage production cannot support current grazing use. (Commenter No. 2)

Response: A resource inventory completed in 1975 identified those allotments where adjustments are needed. We are proposing both upward and downward adjustments to balance use with measured production.

9. Comment: Objective Three of the ES implies that the removal of livestock from an area is needed so that plants propagate on their own. (Commenter No. 2)

Response: This implications was not intended in objective three. Seed trampling and rest periods for seeding establishment are important, integral parts of proposed grazing systems, and do require livestock concentrations and movements (see Figures I-1, I-2, and the narrative on pages I-9 and I-19).

10. Comment: Nothing has been said in the ES about the control of noxious weeds; seed dispersal is again done by livestock, wildlife, birds, water and air. The cocklebur sticks to the animal and is seeded indiscriminantly. These noxious plants are in direct competition with valuable plants and should be controlled. There are numerous wildlife and livestock losses every year during the critical growth stage of these noxious weeds. (Commenter No. 2)

Response: The presence of poisonous plants has been identified in Chapter II, pages 22 through 25. Control of noxious weeds would be handled on a case-by-case basis as the need arises. The proposed Allotment Management Plans provide for emergency movement of livestock during critical poisonous plant periods. No significant impacts on livestock and wildlife from poisonous plants due to implementation of the proposal are anticipated.

11. Comment: The plan for the ES water distribution map will be almost cost prohibitive if implemented in its present form. (Commenter No. 2)

Response: The water distribution systems proposed in the Rio Puerco Grazing Statement were all included in the cost data and subjected to economic analysis as described on page I-34, column two, fourth paragraph. It is believed that the benefits of the system to the ranchers and the public will offset the cost.

12. Comment: Water catchments are inefficient. Tar water is generally unacceptable to livestock, and may be dangerous to their health. (Commenter No. 2)

Response: The catchments described in the Rio Puerco Grazing Statement are constructed with a cover over the pit so that loss by evaporation would be eliminated and the water would stay clean. Butyl rubber is used for the pit lining and cover, rather than tar.

13. Comment: Short-term non-use implies livestock will have to be removed from an area, and grazing either partially or totally eliminated. (Commenter No. 2)

Response: The short-term non-use alternative requires that livestock be moved several more times per year than would be the case with the proposal as stated in Chapter I. It does not mean that the number of cattle would be any less than that proposed in Chapter I, nor would grazing be partially or totally eliminated.

14. Comment: The ES is based on absolute interpretation of a one-year data base (forage inventory), without apparent information on actual forage capacities of

given pastures for implementaon of a grazing system. (Commenter No. 3)

Response: Grazing capacity figures were established from the 1975 Resource Data Inventory as correlated with 20 years of data from the San Luis Study. Estimates were compiled for each pasture. The process outlined in Appendix I-1, pages A-1 through A-5 describes the methodology for determining actual forage capacities.

The AMPs prepared for the 57 allotments with grazing systems provide for annual adjustments in numbers, depending on utilization and available forage. BLM guidance provides for annual studies including plant utilization, actual grazing use, vegetative condition, trend and precipitation.

15. Comment: Experience has shown that the Hormay rest-rotation system as proposed in the ES has not been overly successful in the Southwest. (Commenter No. 3)

Response: The Albuquerque District's dealings with the system have been generally favorable where proper stocking rates and use periods were followed, and where adequate range improvements were constructed and maintained.

16. Comment: How does a rest-rotation system work in the allotments with only one to three pastures, and how do five-, six- and seven-pasture allotments fit into the climatic four-pasture rest-rotation scheme? (Commenter No. 3)

Response: As stated in Chapter I, the actual grazing systems vary. However, all rest-rotation systems are based on the same principles whether they are used on a one-pasture or a seven-pasture allotment (see pages I-9, I-18, and I-19).

When a one-pasture rest-rotation system is used, (as in the case of the Corrales Tierra), both public and other lands are included in the system. In this way, the public lands can be rested as prescribed based on rest-rotation principles.

In an allotment with five or more pastures, rest-rotation principles are applied, with more than one pasture receiving a particular treatment.

17. Comment: The ES does not include data on actual forage capacities of given pastures for implementation of a grazing system. The Hormay system requires that pastures be of equal carrying capacity, but there is no indication in the ES of livestock forage balance between pastures to make the system work. (Commenter No. 3)

Response: Data on actual forage capacities of all pastures is not in the ES; however, it is included in each Allotment Management Plan. This information was used to balance use periods with the carrying capacity of each pasture in each AMP.

The Hormay rest-rotation grazing system does not require pastures of equal carrying capacity, although this ideal situation is highly desirable and should be used if possible.

18. Comment: It seems in the ES that livestock grazing takes second place to other considerations. The impacts of grazing are lost in sections concerning other topics, such as cultural resources, visual resources, transportation, etc. This is also noted in the reference section, where range comprises thirteen percent (13%) of the citations, while wildlife comprises thirty percent (30%). (Commenter No. 3)

Response: The ES deals with the livestock grazing program and the impacts associated with this program. Other topics are mentioned because they are impacted by the proposal. Those resources impacted less are given less attention. The number of citations in the reference section is not a good gauge to measure the quality of the ES.

19. Comment: Map II-14 on page II-89 is not complete, in that a legend is provided with shadings to indicate the grazing areas and the study areas, but the map itself does not include any shadings. As presented, Los Alamos, Espanola, and Santa Fe, which are on the map, could be interpreted as being in the study area, which they are not. (Commenter No. 4)

Response: The map has been changed.

20. Comment: The calving percentages on page II-90 were based on total animal units, and a rate of eighty percent (80%) was used. Calving percentages in the source used were based on cows and heifers of breeding ages. A review of these rates indicates that (when based on total animal units) the rates were sixty-four percent (64%) on subsistence ranches, seventy percent (70%) on small commercial ranches, and eighty-nine (89%) on medium-size commercial ranches. A weighted average rate should be seventy percent (70%). (Commenter No. 4)

Response The text has been changed.

21. Comment: The calf price used on page II-90 was forty-two cents (42¢) per pound. Prices received by ranchers in New Mexico were thirty-point-nine cents (30.9 ¢) in 1974, twenty-seven-point-four cents (27.4 ¢) in 1975, and thirty-two cents even (32.0¢) in 1976. Pricing should be adjusted to a lower level for 1975-1976, probably about thirty cents (30¢) per pound. (Commenter No. 4)

Response: The text has been changed to reflect this comment.

22. Comment: The estimation of receipts from calf sales on page II-90, in which all calves produced are sold, is not realistic.

Approximately sixteen percent (16%) of the calves in New Mexico are heifers reserved for breeding herd. Sales each year are a combination of calves, off-season yearling steers, heifer yearlings which subsequently were not suitable for the breeding herd, and cull cows and bulls. (Commenter No. 4)

Response: It is recognized that not all calves produced are sold. Some calves are kept for replacements, while yearlings, cull cows, and some bulls are sold each year. For comparison we show all calves as being sold each year and do not figure in other age groups. Our dollar figures for calves only may be ten percent (10%) lower than that of all age groups if sold.

23. Comment: The sources that are used for the social information, particularly the attitude survey on pages II-94 through II-96, are difficult to determine for specific paragraphs. For instance, what is the source for the percentages in column two of page II-95? (Commenter No. 4)

Response: Column two on page II-95 and the bottom two-thirds of column one are based on information gathered through informal conversations by Bureau personnel with permittees in the ES area.

24. Comment: The socioeconomic sections in both Chapter II and Chapter VIII do not include discussions of impacts on the infrastructures of affected communities. Although impacts were minimal because of sparse populations, some mention should be made of impacts on community services and costs. (Commenter No. 4)

Response: The Bureau determined that the impacts on infrastructure would be minor. Therefore, discussion of the existing situation was not included in Chapter II, nor of impacts in Chapters III and VIII.

25. Comment: Somehwat confusing is the intent of such a biased study. The Natural Resources Defense Council (NRDC) questioned the feasibility of livestock grazing on range lands, particularly on the public lands. Livestock grazing has been a beneficial practice which has enhanced the ranges in many, many areas. Cattle and sheep have converted natural renewable resources into edible protein and usable fiber of which the majority of the population of these United States have been the beneficiaries. Was not the purpose of the NRDC lawsuit to evaluate the effect of livestock grazing on the western ranges? The ES does not satisfactorily accomplish this. (Commenter No. 5)

Response: The NRDC lawsuit was for the purpose of evaluating the effects of livestock grazing on the public lands. The intent of the Rio Puerco ES is to evaluate livestock grazing on public lands under intensive livestock grazing management through the implementation of Allotment Management Plans (including development of necessary range improvements). Also evaluated are possible alternatives to the proposal (no grazing, no action, short-term non-use, forage maximization, and pasture level stocking). Table VIII-1 (pages VIII-2 and -3) is a comparison of these alternatives with the proposal.

26. Comment: Improvements such as some of those proposed in the ES are excessively costly and inefficient. No allowance was made for increased costs due to inflation. (Commenter No. 5)

Response: The costs of the improvements proposed to implement the intensive grazing management program were figured on comparative cost data for installation of this type of project in 1976. The Albuquerque district has, in the past, installed projects of the type being proposed, and has found them to be efficient for the purposes they were intended.

No allowance for inflation was made in the ES. If actual costs are higher when construction begins, additional funds may have to be programmed to implement the projects.

27. Comment: The four catchments proposed for the Rio Puerco area are extremely costly and of little benefit. Fifty thousand (50,000) gallons of storage will provide water for less than twelve (12) cows. (Commenter No. 5)

Response: The catchments were designed to provide sufficient water for grazing animals to harvest available forage in an area.

Although the costs of these catchments appear high, other alternatives considered were less feasible and more costly.

28. Comment: The fence types proposed in the ES do not meet state standards, and may subject permittees to litigation in the event livestock transmit contagious diseases to a neighbor's herd. Trespass violations will quite possibly be numerous, and may not be the fault of the permittee. (Commenter No. 5)

Response: On public lands, fences are constructed according to Bureau standards rather than those of the state. The standards are designed to meet multiple use management objectives for the area, and are found in Sections 9170 and 1737 of the Bureau's Manual. This type of fence has been effective in controlling livestock on public lands in many areas of the West.

29. Comment: The AMPs are going to be restrictive and, in some cases, will spell out the financial ruin of the permittee. Forced land use planning is both unconstitutional and unlawful. Lessees are in violation of state law if they enter into a secondary contract on state lands. The right to own

private land is granted by the Constitution, and no governmental agency has the right to govern or manage private land. (Commenter No. 3)

Response: The proposed AMPs may be restrictive when compared to yearlong grazing that has been taking place. The Bureau has had implemented AMPs in the area since the mid-1960's. To date, we are not aware of any operator who has been ruined through our AMP program. BLM has completed its land use planning for the ES area (see BLM Multiple Use Planning in Chapter I).

We do not intend to go into secondary contracts on state land, nor have we the authority to manage private lands. These state or private lands may be fenced, or stock may be herded. We have the responsibility to manage the public lands. (Credit will be given for the grazing capacities on the private and state lands only if they are offered under an exchange-of-use agreement. This is an agreement issued to applicants having private and state land interspersed with and normally grazed in conjunction with the public lands. During the life of the agreement, the Bureau has management and control of these private and state lands for grazing purposes only.)

30. Comment: Although reduction of sediment by a maximum of five hundred and forty (540) tons sounds very impressive, it actually amounts to a soil thickness of less than one-sixteenth of an inch (1/16") per section of land. The economic impact on not only the operators, but on the communities as well, is a large price to pay for such a small reduction. More effective and far-reaching benefits could be achieved by mechanical treatment, rather than reduction in grazing capacities. (Commenter No. 5)

Response: Sediment yield is not uniform over any given section of land. Concentration of runoff in swales, depressions, and gully areas results in a much greater proportion of the sediment coming from these areas. Gullies continue to widen and deepen, destroying areas which, in many cases, have high forage production capabilities. Sediment yield in such areas reduces access, clogs down-slope water retention or distribution facilities, decreases water quality, and may cause damage to other structures and improvements. The accrued benefits from even a relatively "small" reduction in sediment yield are magnified when considered from this perspective. Increasing vegetative cover by means of applying the proposed action will work to allow greater infiltration of precipitation and reduce the destructive concentration of runoff waters. Geologic erosion and sediment yield, however, will continue despite any reasonable yield reduction of the proposed action, making it appear of lesser consequence than is actually the case.

31. Comment: It would be appropriate if the Advisory Board met in session and looked over the ES with BLM personnel. (Commenter No. 2)

Response: At the present time, no advisory boards exist on the Albuquerque District. On December 31, 1976, the Multiple Use Advisory Board went out of existence.

Prior to its expiration, the Multiple Use Board spent a total of two days on the earlier stages of the ES writing. One of those two days was spent in the field going through the ES area and looking at real problems encountered. We received letters from three of the board members regarding the problems and did consider their ideas in the ES.

32. Comment: It seems unfortunate that a total of 32,556 acres of range will remain in poor condition even after the ES is implemented; the situation as presented in Chapter III seems to lock these acres into this class for the next 23 years. (Commenter No. 8)

Response: Chapter III, page 30, Section 24, and Appendix III-3 described the parameters of range condition classes and criteria for classification. By these standards, 32,556 acres will remain in poor range condition. These acres have limited capacity to respond to management. The bulk of these acres has topography and/or soils which do not allow soil stability to occur under any circumstance, and thus will remain in poor range condition.

33. Comment: When the ES process was first started, we were advised of certain recommendations. It seemed rather premative that BLM was already talking about cuts when all of the data wasn't in yet. (Commenter No. 9)

Response: When the process started, we informed the permittees at both meetings--in Cuba and Albuquerque--that a Resource Inventory was to be done on each and every allotment. We stated that adjustment in the stocking would be needed to conform to actual production, in terms of both decreases and increases. We knew that there would be adjustments.

34. Comment: A comparison should be made as to what the impact would be on the environment if no reduction in AUMs were required, especially considering the adverse economic impact that will occur as a result of the planned reductions in the ES. (Commenter No. 9)

Response: BLM is required by Federal regulations to balance use with existing production on public lands. For this reason, the alternative of no reduction in AUMs was not considered viable.

35. Comment: The figure of four hundred (400) people given in the ES as the population of the ES area seems too low; the population of Cuba (1,500 persons) should have been included, as it is the economic and retail base for the area. (Commenter No. 10)

Response: The 400 figure is intended to refer only to those ranching families living within the Rio Puerco planning area. We agree that Cuba and other communities of larger populations are involved. These communities and their relationship to the Rio Puerco area are discussed on Page II-86 of the ES.

36. Comment: The Federal Government should not be involved in managing private lands. However, under the AMPs, BLM will be managing 80,000 acres of private land. (Commenter No. 10)

Response: Refer to response to comment number 29.

37. Comment: The income of livestock producers has more profound effect on local economy than the $9,544 figure given in the ES. (Commenter No. 10)

Response: The $9,544 figure was based on data collected for 1974, and was the estimated net return to the ranchers after they covered their operating costs for the year. Some of the $379,945 operating costs paid by the ranchers would have been spent for goods and services in the Cuba community and would have contributed to community economic strength (see Table II-38 on page II-91 of the ES and the pages preceding it for discussion).

Index of Commenters on Rio Puerco ES*
Letters Received Through October 7, 1977

38. American Motorcyclist Association
39. Bureau of Outdoor Recreation
40. Harold C. Truby
41. Advisory Council on Historic Preservation
42. Southwest Research and Development Company
43. W. C. & L. Byers
44. Nasario Garcia
45. Bureau of Indian Affairs
46. Society for Range Management
47. Goodsight, Inc.
48. Wildlife Management Institute
49. Department of Animal and Range Sciences,
    New Mexico State University
50. New Mexico Natural History Institute
51. Rudy Gutierrez and family
52. State Planning Office/
    Historic Preservation Office
53. David H. Weingarten
54. New Mexico Cattle Growers' Association
55. Jerry Schickedanz
56. The Wilderness Society
57. Merced Lucero
58. Sisto Sandoval
59. Radian Corporation
60. U.S. Fish and Wildlife Service
61. Padilla Brothers
62. USDA - Bureau of Reclamation
63. Larry T. Caudill

*Other letters commenting on the ES but not requiring a response begin on page IX-63.

38

AMERICAN MOTORCYCLIST ASSOCIATION
P.O. Box 141, Westerville, Ohio 43081
Telephone (614) 891-2425
Telex: 245392

August 11, 1977

Bureau of Land Management
Department of the Interior
New Mexico State Office
53550 Pan American Freeway, N.E.
P.O. Box 6770
Albuquerque, New Mexico 87107

Gentlemen:

Thank you very much for forwarding us a copy of the proposed Rio Puerco Livestock and Grazing Management Program. We have taken the opportunity to review the environmental statement as it affects the potential recreational use for our constituents. Specifically, the recreational motorcyclist.

We were pleased to see that motorcycling and off-road vehicle use is being considered in the estimated recreation use levels for the three county area involved in the environmental statement (ES). However, we would caution against the possible underestimation of visitor use days and the number of vehicles being managed. Table II-33 demonstrates the New Mexico Department of Motor Vehicles registration of off-road vehicles in the vicinity of the Rio Puerco area. However, this chart does not take into consideration vehicles that would not be registered with the New Mexico Department of Motor Vehicles. Such vehicles would include motorcycles used exclusively off of the road and not utilized for transportation on public roads. 38

The New Mexico State Comprehensive Outdoor Recreation Plan seems to reflect the potential for unregistered off-road vehicles in their estimate of visitor days per year with McKinnel, Sandoval and Bernalillo counties. However, the BLM estimate for the ES area is revised downward to 170,000 visits. Should this figure be predicted on registration figures it will not reflect on registered off-road vehicles.

The American Motorcyclist Association has long advocated proper management of off-road vehicles to protect the environment. We understand the necessity of applying certain management techniques to our recreational scheme in order to insure future opportunities for off-road

vehicle use. We are pleased to see that off-road vehicle use is included in the Grazing Management Program and that management techniques were considered. If the American Motorcyclist Association can be of assistance we hope you will not hesitate to contact us.

Sincerely yours,

Robert Rasor

Robert Rasor
Associate Director
Legislative Department

RR/cb

Response to Comment from the
American Motorcyclist Association

38. Estimated off-road vehicle use is based on available data, which includes use of unregistered vehicles.

39

United States Department of the Interior
BUREAU OF OUTDOOR RECREATION

SOUTH CENTRAL REGIONAL OFFICE
PATIO PLAZA, 5000 MARBLE N.E., ROOM 211
ALBUQUERQUE, NEW MEXICO 87110

IN REPLY REFER TO:

AUG 17 1977

Memorandum

To: Acting District Manager, Bureau of Land Management, Albuquerque District Office

From: Regional Director, South Central Region

Subject: Review of Draft Environmental Impact Statement for the Proposed Rio Puerco Livestock Grazing Management Program

This responds to your request for our review of the subject statement. The following comments are made on a technical assistance basis only.

39-1 The Summary states that, "Land alteration would adversely affect recreation in the short-term; however, over the long-term, the proposal would be beneficial to recreation." The adverse impacts to recreation include increases in wildfires and smoke (particularly in Mesa de Cuba), vandalism and littering due to increased recreational use, soil surface disturbance for pipeline construction (Mesa de Cuba and La Ventana areas), and the construction of fences (Arroyo Piedra Parada, Gypsum Hill, Ignacio Chavez Grant, and Mesa de Cuba). The only mitigation measure discussed in the statement concerns the visual impact of the proposed fences. Measures to minimize harm stemming from the other above mentioned impacts should be included in the document.

Maps 1-1 and 11-10 indicate that San Ysidro, west of Highway 44, is included in the project area. San Ysidro Park located in the Village of San Ysidro was funded in part with Land and Water Conservation Fund monies.

39-2 The Land and Water Conservation Fund Act of 1965, as amended, Section 6(f), states that no property acquired or developed with assistance from the Fund shall be converted to other than public outdoor recreation uses without the approval of the Secretary of the Interior. If such conversion is anticipated, Ms. Leila Andrews, State Planning Officer, New Mexico State Planning Office, 505 Don Gaspar Avenue, Santa Fe, New Mexico 87503, who administers the Fund in New Mexico should be contacted to initiate the process for obtaining

approval of the Secretary of the Interior. Coordination efforts related to conversion should be stated in the final statement.

We appreciate the opportunity to comment on this statement.

Rolland B Handley

Rolland B. Handley

cc: SLO, New Mexico
OEA, BOR, WASO

Response to Comments from the
Bureau of Outdoor Recreation

39-1. Most of the mentioned adverse impacts to recreation were judged to be unavoidable; they could not be totally alleviated. Further discussion of these situations is found in Chapter V of the ES (see pages V-2 and -3).

39-2. San Ysidro Park will not be converted to uses other than public outdoor recreation. It lies adjacent to but not within the ES area.

40

Counselor, New Mexico
August 25, 1977

Bureau of Land Management
3550 Pan American Freeway NE
P.O. Box 6770
Albuquerque, New Mexico 87107

Dear Sir;

I am writing to you with reference to the Rio Puerco EIS, and I respectfully submit the following comments.

Unfortunately, I have not been able to read the Draft Statement in its entirety, however, Mr. Sparks was courteous enough to present the slide presentation in early July in Aztec for our Livestock Growers Association.

Let me start by saying that I seriously question the quality of defense offered
by BLM in the 1972 suitthat brings the proposed 212 EISs' upon us, I furthur question
validity of the outcome of both the Challis Idaho and the Rio Puerco EIS. In
both cases there is little more indicated than extensive overgrazing and misuse
by the livestock industry of the Public Lands. I am not familiar with Challis,
40 Idaho, but consider myself reasonably well informed in the Rio Puerco area. In
1972 I attended a range tour conducted by BLM in the area. Throughout the day
long tour cost management techniques and very elaborate improvements were stressed
and were indeed very impressive. Now the EIS thoroughly indicates misuse on the part
of the livestock industry. I am both amazed and bewildered by this complete turn
around of BLM's opinion of their own actions.

For the moment let us refer to the slide presentation in part. The log dams on the Puerco were shown with no mention of the efforts of the people who built them with little more than an axe and a team, no mention of their objectives and efforts, only that the river was 12 feet deeper.

Next, the charts with livestock numbers through the years. Did not BLM set these carrying capacities? It should also be noted that many of the people in this area have paid for years on this capacity while in fact they had fewer or no cattle on the land in lieu of drought and economics. They do this in fear of permit cuts by BLM and lack of understanding of non-use factors available.

I could continue to attack virtually every slide, however in the interest of expedience I will simply conclude with a challenge to a presentation of the same slides set to different wording. We would indeed have an entirely different opinion projected of the livestock industry.

I respectfully but strongly object to the image the Rio Puerco EIS projects of the livestock industry. One has only to drive from Cuba to San Ysidro as I did this past Monday to fully realize the inequity set forth in the EIS in its present form. The permitees of the Rio Puerco do not deserve this.

Sincerely,

Harold C. Truby

Harold C. Truby

Response to Comment from Harold C. Truby

40. The 1975 Resource Inventory did identify areas of overgrazing, as well as areas in which forage production exceeded current grazing use. On the 1972 tour, we showed areas in good condition and under good management. These good conditions were generally a result of implemented AMPs. The elaborate improvements referred to in your comment were improvements used in conjunction with these AMPs. The fact that some areas are in good condition points out the opportunity for better management over the rest of the area.

41

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

August 24, 1977

Mr. Gordon A. Frashier
Acting District Manager
Bureau of Land Management
3550 Pan American Freeway, N.E.
P. O. Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Frashier:

This is in response to your letter of July 28, 1977, requesting the Council's comments pursuant to the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800) on the proposed Rio Puerco Livestock Grazing Management Program, Sandoval and McKinley Counties, New Mexico.

Section 106 of the National Historic Preservation Act (16 U.S.C. 470f, as amended, 90 Stat. 1320) requires the head of a Federal agency to afford the Council an opportunity to comment on an undertaking once he has determined that the undertaking will affect a property included in or eligible for inclusion in the National Register of Historic Places. We note from our review of the Draft Environmental Statement (DES) submitted with your letter, statements which indicate the Bureau of Land Management cannot determine the project's effects on cultural resources until individual Environmental Assessment Records are prepared for specific actions generated by the proposal. Based on those statements, we believe the BLM's request for comments pursuant to the "Procedures" is premature.

41

Therefore, it is suggested that the BLM continue its coordination of this proposal with the New Mexico State Historic Preservation Officer during the early stages of specific project planning, and at such time the individual Environmental Assessment Records are developed, afford the Council an opportunity to comment, as appropriate at that time. Should you desire to discuss this matter further, please contact Michael H. Bureman of the Council's Denver staff at (303) 234-4946. Your continued cooperation is appreciated.

Sincerely yours,

Michael H. Bu
Louis S. Wall
fr—Assistant Director, Office of
Review and Compliance

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of

---

Response to Comment from the
Advisory Council on Historic Preservation

41. The Code of Federal Regulations (36 CFR 800.2) states: ". . . the Advisory Council instructs Federal agencies to coordinate NEPA compliance with the separate responsibilities of the National Historic Preservation Act and Executive Order 11593 to ensure that historic and cultural resources are given proper consideration in the preparation of environmental impact statements."

In accordance with the comment letter, the BLM will continue to coordinate specific project planning with the State Historic Preservation Officer and will afford the Council an opportunity to comment as appropriate at that time.

42

SRD

MANAGING BOARD
DR. WILLIAM GORMAN
505-523-[illegible]
DR. CONRAD KEYES, JR.
505-52[illegible]-7333
MR. RUSSEL KILMORE
505-5[illegible]
DR. ROBERT H. LANSFORD
505-5[illegible]-3660
DR. WILLIAM A. BARKLEY
505-524-0375

Southwest Research and Development Company
1825 IMPERIAL RIDGE • LAS CRUCES, NEW MEXICO 88001

August 30, 1977

Rodney Harris
Acting District Manager
Bureau of Land Management
P. O. Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Harris:

We have reviewed most of the draft environmental statement for the Proposed Rio Puerco Livestock Grazing Management Program. The overall statement looks real good, however, we do have some suggestions to improve the quality of the statement.

42-1 Figure I-9, pg. I-41: The legend number [1] and [2] are backward.

42-2 Page II-11, Quantity of Surface Water: the use of depth of run-off (not defined in the glossary) is very misleading. The values of 0.03 inch or 1.3 inches are not recorded by any gage and are not in the streamflow records. Also, Burkham's work was in 1961. His empirical equation should be stated for the yield from a 0.1 square mile drainage rounds off to 0.7 (0.74 from $R=30\ A_d^{0.88}$).

42-3 Figure II-1, page II-12: The source is not given. In fact almost none of the figures have the source on the.

42-4 Page III-20, 16. Less Water Available for Reservoirs: The sentence "Floods of the ten year magnitude orginating in the upper Rio Puerco usually disappear in the channel bottoms long before they reach the confluence with the Rio Grande." This is really questionable, for flows of 5000 cfs to over 10,000 cfs over the type watersheds in Table III-6 are likely. Surely these flows that occur reach the confluence with the Rio Grande near Socorro. Otherwise, no suspended solids from the Rio Puerco drainage would ever contribute to the load in the Rio Grande. The computations for the values in Table III-6 and also Table II-5 should be provided in the Appendix. Also, it is possible to have three 10-year storms back-to-back. What would happen during this likely situation?

42-5 Page IX-1, Consultation and Coordination in Preparation of the Draft ES: The fourteen contracts were not to only Universities as stated, even Appendix IX-1 shows this.

42-6 Glossary, page G-4: Convectional thunderstorms implies only summer--this is not completely true, for in January 1969 Cuba had about 12 days in a row of convectional activity. Also, "This phenomenon results---" should be used.

42-7 References: --A lot of work needed. Most of these could not be obtained by the small amount of information given, i.e.:

Aldon, Earl F. and George Garcia, no publication office.
Barkley, William A., Southwest Research and Development, Contract No.---------.
Burkham, 1961. Washington, D.C?
Keyes, Conrad, G., Jr. (bottom of R-7), which one, where, how, etc.
Keyes, Conrad, G. Jr., (top of R-8), why not final report, what company, where?
N.M.S.U., 1976, Contract No. for who, where, how, etc.?

Thank you for giving us the opportunity to review the environmental statement. Good luck with the total review process.

Sincerely,

Conrad G. Keyes, Jr.

Conrad G. Keyes, Jr.
Secretary

CGK:tk

43

7601 SECOND N.W., ALBUQUERQUE, NEW MEXICO 37107

Bureau of Land Management
P.O. Box 6770
Albuquerque, N.M. 87107

Attention: Mr. John Whitney

Subject: Draft Environment Statement, Proposed Rio Puerco
Livestock Grazing Management Program.

Gentlemen:

We have carefully studied the subject proposal and wish to submit commentary pursuant to our telephone conversation of August 31st. Overall, we find it is a very well researched compilation of diverse data in related fields, essential to the formulation of a sound, practical conservation program. We also feel it is deficient in information and/or proposals in several areas, which we will outline in this letter.

We agree with the objectives outlined in Chapter I "Objectives", page I-1. And we agree with Methods of Implementation (2) and (4) therein. We cannot render judgement of method (3) pending clarification of relationship of deeded ground to AMPs in proposed combined grazing allotments. We are compelled to state strongly felt opposition to method (1): "Combine some existing allotments into new allotments etc." We see achievement of the objectives only minimally (if any) affected by the implementation of this, and that the physical and financial adversities that will be imposed on the affected Operators are not justified. To name a few that will be realistically impossible to resolve in practice:

43-1

1. Individual responsibility incentive as regards care of both land and livestock will be destroyed.
2. The practice of stringent livestock management in disease and parasite control will be impossible.
3. Progressive livestock breeding objectives cannot be pursued with the intermingling of purebred and crossbred livestock in combined grazing allotments.
4. There is an irreconcilability of resident and non-resident Operators in combined grazing allotments; the increased burden in non-compensated time & effort which will naturally fall upon resident Operators is subject to so many variables as to be inestimable.

We find the subject proposal deficient in specific data and proposals regarding integration, or non-integration, of deeded ground into AMPs involving combined grazing allotments. This is a vital, important subject with tremendous ramifications which require detailed clarification.

Presently few (if any) private holdings are fenced separately from the public ground they graze. Thus, under combined grazing allotments, are private holdings to be fenced (and by whom) and to be treated separately from the combined grazing of public grounds? If the Operator refuses to render his private ground from his private use, is his right to graze public grounds abrogated?

43-2 We find the proposal very deficient in provisions for increased fire control, inview of the anticipated increased fire activity due to heavier forage etc. In many areas, the nature of the land locates Operators one, two or more hours' drive from the nearest telephone to report a fire. In the case of a resident Operator specifically, the financial investment amounts to a considerable sum in home, barns, equipment, sheds, etc. in addition to livestock. If by the proposal, the Operator is required to reduce his grazing to promote forage, it is equally important that his protection from the fire hazard of that forage is increased.

Personally, we are interested and wish to support a practical plan to promote conservation of soil, wildlife, esthetic qualities etc. provided it does not impose upon us a burden that we cannot live with.

Our Rio Puerco property, with grazing privileges, was acquired on June 1, 1977. Our first decision was to not graze any of it (private or public) the rest of this year in order to build up the forage. To this end, livestock we presently own is being contained and fed in town to preserve the range. We do intend to move a couple of horses into corrals at the ranch shortly, for the purpose of fence repair. A member of our family is living there, and we have moved in a tractor for the purpose of starting soil erosion control. We intend to totally occupy the ranch within the next twelve to eighteen months, building home, barns, equipment sheds, shop to that purpose. We have been involved with purebred horses and cattle for many years, and our ranch operation will be involved in registered cattle.

As you can see by our voluntary non-grazing of both private & public land, we are genuinely interested in promoting increased forage, which will curtail erosion, etc. Thus the AUM outback proposal does not greatly disturb us. However, the combined grazing allotment proposal does disturb us greatly, as it is totally contradictory to our (1) resident operator status, and (2) purebred livestock operation.

As stated in our telephone conversation, we look forward to a meeting with BLM to discuss these problems at your earliest convenience. Having just recently acquired the property, we were only made aware of the subject proposal at the meeting last night. We can be contacted in Albuquerque at 898-4904, or by message with our answering service, 893-0633.

Yours truly,

W. C. Byers

August 31, 1977

42

Response to Comment from
Southwest Research and Development Company

42-1. This has been changed in the text.

42-2. The values recorded at the gauge are in cubic feet per second (CFS). The values for the gauge on the Rio Puerco were 1.1 CFS in 1974 and 40.7 CFS in 1958 in a watershed drainage of 268,000 acres. It was converted to depth of runoff in inches for comparison purposes with other watershed areas. Depth of runoff provides a very good comparison on a unit area basis. With cubic feet per second (CFS) or acre-feet as a unit of measure, the area of the watershed has to be included in the calculations to come up with a comparison.

42-3. This source has been added to the reference section.

42-4. This sentence has been deleted.

42-5. The text has been changed to reflect this fact.

42-6. The Glossary definition has been modified.

42-7. The references as mentioned have been corrected. (Note: Burkham's work was published in 1966, as stated in the ES.)

43

Response to Comments from W. C. and L. Byers

43-1. All individuals owning private land within a combined community allotment will be given an opportunity to obtain an exchange-of-use permit. Those individuals will be given credit for the grazing capacity of that private land within the grazing area, even though other users will be grazing the land from time to time. No fee shall be charged for this grazing use. During the term of the exchange-of-use permit, the Bureau shall have management control of such private lands for grazing purposes.

Privately controlled lands in a combined allotment offered for exchange of use will be available for use by all licensees in the allotment. However, credit for forage production on these lands will only be given to the individual controlling these private or state lands (see response to comment number 29 explaining exchange of use).

If the intermingled private lands are not offered under exchange of use, it will be the responsibility of the private landowner to protect his property and to control his livestock.

43-2. The BLM Albuquerque District prepares a fire plan each year based on the conditions expected during the upcoming fire season. As fire danger increases, control would also increase.

Increased fire activity is an adverse impact which cannot be avoided completely (see Chapter V of the ES).

44

September 3, 1977

Rodney Harris
Bureau of Land Management
3550 Pan American Free way NE
P. O. Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Harris:

I should like to thank you for sending me a copy of the Draft Environmental Statement on Grazing Management in the Río Puerco Espíritu Santa Area. Enclosed with that statement was notice on forthcoming public hearings concerning the adequacy of the statement and the invitation for written input on the statement as well.

Accordingly, I should like to avail myself of the opportunity and hereby submit to you the following statement that my father, Nasario P. García, asked me to compose in his behalf. This statement reflects as closely as possible his sentiments about future land distribution he and others have had access to in the past in the Guadalupe area. The statement follows:

> The combination of "64 ranches on 58 allotments with other allotments to form larger, more manageable units" (c/f Summary Final Environmental Statement) is totally and unequivocally unsatisfactory. My pasturing privileges, which include the Palomino Pasture, Ojo de Pula Pasture, and the García Pasture are already a result of a reassignment. I want to continue to belong to this set-up as it exists now and would oppose any further combination.
>
> The main difficulty and complaint that I have about the three pastures under which I fall now is that the Bureau of Land Management(BLM) has failed time and again to respond to the more basic needs of the farmer; e.g., water. When all interested parties agreed upon these three pastures it was understood that the BLM would build two lagoons to supply water for livestock but nothing has been done to date. If we had water in the respective pastures, then we could alternate more easily between pastures in order to avoid over-grazing. At the present time that is difficult to accomplish because of the shortage of water. Six or seven years have elapsed since the BLM agreed to build the lagoons.
>
> Thus, what assurance can I or anyone else have that further changes and promises will be coupled with positive action for improvements from BLM? I have

> become increasingly skeptical and distrustful of BLM's ability to take a genuine initiative in moving forward with promises made that will aid and abet the little farmer in the area of Guadalupe.
>
> Moreover, rents have become excessive, and yet we get absolutely no help from BLM. The increase in rents have not been justified because, in my opinion, we comply with paying higher rents but no improvements are made. It should be a two-way street and so far that has not been the case. I feel there is a conspiracy to push us out of existence.

The foregoing statement concludes what my father asked me to include in this letter.

At this time I should like to address myself to a couple of concerns that emanate from the Environmental Statement(in a letter to me from R.Keith Miller, District Manager, BLM he indicated that BLM had made decision not to prepare an environmental statement. Date of letter was July 22, 1976). 44-1 I am frankly puzzled by the seeming contradiction in the Summary(c/f Summary #3, to wit: Summary of Environmental Impacts). On the one hand the thrust seems to indicate that the Espíritu Santo Area will eventually become a recreational area; on the otherhand, how can "annual receipts from calf sales ... increase approximately five times by the year 2000"? The Table II-45 on page II-109, ALLOTMENTS WITOUT IMPLEMENTED AMPs seems to attest to the contradiction alluded to above; it also includes the pastures to which my father belongs. It would tend to bear out my father's preoccupation--shared by others including me--about the Federal Government's attempt to eliminate the little farmer or livestock holder who tries to eke out an existence, a meager one at that!

On June 18, 1976, I provided to Mr. Jon Durham, Bureau of Land Management, input on the "Technical Report and Environmental Analysis Record for Proposed Geothermal Leasing of Cabezón, San Ysidro, and Santa Ana Mesa Country." Subsequently, (July 1976) his office informed me that a series of public meetings would be held in March 1977 to apprise the public of the Environmental Impact Statement whereupon I requested that BLM office notify me of the specific meetings and their dates. Unfortunately, I was never notified. Perhaps this oversight revolves around the inefficacy of an office where there is a rapid turnover?

44-2 On Chapter IX on Consultation and Coordination in Preparation of the Draft Environmental Statement, one reads about the methodology pursuant to the gathering of data and the various universities the BLM entered into contract with. I am concerned that many of the contracted sources' credibility and expertise can be in some cases far less reliable than those of professional educators like myself who grew-up in the Guadalupe area whose cultural, historical and sociological interests formulate part of one's own academic endeavors. Pages IX-1--IX-4 do not indicate that the residents or former residents of Guadalupe had any input. If this is true, I regret it very much. I reiterate, there are individuals such as myself who were raised in Guadalupe, yet I was not sought by BLM to provide information at all in conjunction with the universities involved. Somehow I feel that I was duped if not slighted. For this I am disappointed. It is ironic that an "outsider's" opinion is frequently more valid and bonifide in the eyes of governmental bureaucrats.

I trust that my father's statement and my comments are read into the record as an integral part of the public hearings regarding the Draft Environmental Statement for the Proposed Río Puerco Livestock Grazing Management Program.

I would appreciate any reaction to the statement and letter contained herein be sent to me and to my father.

Respectually submitted,

Nasario García, Ph.D.
15 Meadowbrook
Pueblo, CO. 81001

cc: Senator Pete Domenici
Senator Harrison Schmitt

Response to Comments from Nasario Garcia

44-1. The Espiritu Santo area is now used for recreation, and this use is expected to increase in the future. It will also be used for grazing; the area will not be limited to a single use, but will be managed under a multiple use concept.

Annual receipts from calf sales will increase approximately five times due to the influence of better management implemented by the ES proposal, as well as inflation.

Projected calf crop by the year 2000 would be approximately double the present figure, and the market value of calves is expected to increase. (See page II-90 for the existing situation and page III-61 for projections with the proposal for the year 2000.)

44-2. Refer to the response to comment number 4.

45

IN REPLY REFER TO:
Environmental Quality
305

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
ALBUQUERQUE AREA OFFICE
P.O. BOX 8327
ALBUQUERQUE, NEW MEXICO 87108

AUG 31 1977

Memorandum

To: District Manager, Bureau of Land Management, Albuquerque

From: Area Director

Subject: Review of Draft Environmental Impact Statement for the Proposed Rio Puerco Livestock Grazing Management Program, Sandoval and McKinley Counties, New Mexico

We have reviewed the subject statement within our special expertise and jurisdiction and have the following comments to make.

GENERAL COMMENTS:

The only Indian use involved is the Zia Pueblo Allotment. Under the present allotment designation this is number 88. Under the proposed allotment management plan, the Zia Pueblo allotment would be designated as Gypsum Hill number 61. Under present management, the Zia Pueblo is permitted 480 animal unit months grazing. The animal unit months of available forage currently available is 262. The current rate of stocking is 218 AUM's in excess of the rate proposed under the management plan. Under present levels of management and stocking, the projected AUM's of grazing available by the year 2,000 is 190. This represents a steady loss in grazing to the Zia Pueblo livestockmen under present levels of management. (Ref. Table II-45, Page II-109).

Under the proposed action, stocking would be reduced by 218 AUM's. However, by the year 2,000, it is projected that forage production would improve to the extent that 770 AUM's of grazing will be available. This represents a 300% increase in available forage over existing levels of production. (Table III-15, Page III-57).

The adverse-impacts to the livestock industry, the mitigating measures proposed and the long range beneficial impact's for the project area are adequately assessed with the following exception:

On Page II-23, it is stated that production in AUM's is estimated on a basis of 50% utilization of key forage species for grazing

CONSERVE AMERICA'S ENERGY

-2-

45 animals. Presumably all key forage species are used in arriving at a computation of production levels. Experience indicates that stocking on this basis assumes management at a level which will improve plant vigor and the amount of production, but will have little effect upon changing the relative percentages of species composition within a vegetative type. Thus, range condition would not be significantly affected.

The final environmental statement should discuss the degree to which proposed stocking rates give recognition to plants in short supply or which are non-existant under present range conditions. The DES assumes an improvement in range condition. (Change in vegetative composition). It should be explained in the final environmental statement how this will be accomplished under a management system which bases stocking on proper use of existing vegetative composit on.

Jerry L. Folsom
Acting Area Director

Response to Comment from the
Bureau of Indian Affairs

45. To improve range condition, existing use and forage production must be balanced. Also necessary is the development of a grazing system which is designed to provide for the continuing physiological needs of desirable vegetation. See Grazing Systems pages I-9 and -19. The improvement in range condition is not based solely upon species composition changes. See Appendix III-3 which explains the methodology used to determine range condition. The expected changes in range condition are discussed in impact 24 (page III-30).

46

Route 4, Box 133-A
Los Lunas, New Mexico 87031

September 8, 1977

District Manager
Bureau of Land Management
U. S. Department of Interior
3550 Pan American Freeway, N.E.
P. O. Box 6770
Albuquerque, New Mexico 87107

Dear Sir:

On behalf of the New Mexico Section, Society for Range Management, I have reviewed the Draft Environmental Statement of the Proposed Rio Puerco Livestock Grazing Management Program.

The Bureau of Land Management is to be commended for the thoroughness and for the detail embodied in this statement. While I am sure some may question certain elements of the data used and the conclusions reached, there is little doubt but what BLM made a conscientious effort to develop a complete and indepth study of the Rio Puerco unit and from this study reached logical conclusions.

Grazing management objectives are well defined. Although ambitious they seem to be capable of attainment if needed money is available and there is complete cooperation of the people, both public and private, who will be involved in the program.

The proposal, Intensive Grazing Management, seems to meet the social and economic objective of the Rio Puerco unit. However, it is my opinion that the alternative, Forage Maximization, would be much more attractive from almost every standpoint. This alternative would add 958 head of cattle to the unit at a cost of $38.00 per AUM. Amortized over a ten-year period, this seems a small cost indeed for the benefits obtained, not only to the livestock people but to the public in general because of a more productive and stable land.

The EIS did not, in my opinion, advance a convincing argument on why the Forage Maximization proposal should not be selected. Vegetative manipulation on 61,390 acres would not create any unacceptable environmental impacts. In fact, such a program, if properly conducted, would enhance many resources and activities on the area involved. Under such an effort, wildlife specie diversity would very likely be improved because of additional "edge" and an increased food supply. Using proper procedures, fire and chaining need not seriously impact the residual ponderosa pine stands nor the cultural resources. Visual contrasts resulting from modifying the pinyon-juniper stands need not be adverse. On the contrary, such work can be made to improve the beauty of an area by breaking the monotony of the landscape.

Altering sagebrush and pinyon-juniper stands will very likely have a more pronounced beneficial effect upon big game habitat than the EIS indicates.

46-1 In regard to the discussion on unavoidable impacts, wildfire need not pose a severe threat to cultural resources. Isn't it true that the vast majority of cultural resources would not be seriously affected by wildfire? Further, it is difficult to conceive of either of the two alternatives herein discussed, Intensive Management or Forage Maximization, creating fuels that would be unmanageable from a fire standpoint.

For the reasons cited above as well as the support contained in the EIS, it is hoped that serious consideration will be given to the Forage Maximization proposal. For the area under study, a healthy and viable livestock economy would seem to be a major management objective.

The following comments deal with aspects of both the proposal and the Forage Maximization alternative since they are closely related in many respects.

46-2 1. Temper mitigating measures with economic reality. For example, be selective in the posts you paint to improve the visual aspects of fence construction. Most likely, the majority of posts in fences and around springs will not need paint. Moreover, most will mellow with age and better fit the natural environment without paint.

Another example, be selective in the pine trees that are to be protected from fire. Reaching too far on such a project could easily make the entire project cost prohibitive.

46-3 2. Promiscuous or destructive ORV use should be prevented. On the other hand, there is a need for such use and it should be provided for where it can be accommodated.

3. The effort made during the study to identify and protect cultural resources is commendable. This need is especially noteworthy in an area so rich in cultural resource values.

46-4 4. It would seem desirable for the affected livestock operators to participate in the development of allotment management plans and in planning and designing needed range improvements. Wouldn't it be desirable for the EIS to more clearly reflect this aspect of planning?

Likewise, the Fish and Wildlife Service and the State Game and Fish Departments should be involved in wildlife habitat improvements, in planning management for wildlife areas, and in developing coordination measures for application on domestic livestock grazing allotments.

46-5 5. While the EIS recognizes the need for a degree of flexibility in the management system proposed for application to allotments within the Rio Puerco area, it would seem desirable to not be locked completely into one philosophy. To meet the economic needs of the operator and the environmental needs of the land demands great freedom on the part of the professional manager. I don't detect this freedom in the EIS. At this stage, it would seem more desirable to set guidelines and objectives for allotment management rather than prescribe definite management systems.

46-6 One final comment: The public's response period is much too short. In an undertaking of this nature, a 60 to 90-day review and comment period would seem more realistic and desirable.

The Board of Directors, Society for Range Management, at their July 1977 meeting adopted a Position Statement on Environmental Impact Statements. A copy is enclosed. While the Rio Puerco Management Program EIS was quite lengthy, I feel that in most respects it meets the objectives of the SRM Position Statement.

Since my committee members have not had an opportunity to review these comments I am sending them a copy with the suggestion they write you direct in the event they disagree with any of my conclusions or have additional information to add. In this way, their comments may have a chance to reach you before the September 14 deadline.

Sincerely,

Wm. D. Hurst

Wm. D. Hurst, Chairman
I&E Committee
New Mexico Section SRM

Enclosure

Position Statement on Environmental Impact Statements

Society for Range Management

It is the position of the Society for Range Management that:

1) The requirements of the National Environmental Policy Act be met in agency planning processes.

2)Each environmental impact statement be based on valid data. Where additional data becomes a necessity, proposals should be deferred until adequate data are collected.

3) The impacts of any single use be considered in context with othe uses impacting on the environment.

4) Only personnel qualified by formal education and practical experience pertinent to the uses of the resources being evaluated should be employed in the development of an environmental impact statement.

5) The agencies and/or other interested parties provide adequate time for development of a technically sound and legally defensible environmental impact statement. Awarding additional time to meet legal or other requirements may be an important consideration.

6) The planning unit addressed by each environmental impact statement be the broadest contiguous geographic unit administered b the agency.

7) Each environmental impact statement be concisely written for clarity in communication, economy in preparation and effectiveness in application.

Adopted by the Board of Directors of the Society for Range Management July 22 1977.

Response to Comments from the Society for Range Management

46-1. The impacts discussed in the ES are demonstrable and serious threats to cultural resources. The effects described which modify cultural material and alter carbon-14 and thermoluminescent dates would occur to most types of cultural resources existing in the ES area.

46-2. Economic reality was considered in the development of mitigating measures proposed in Chapter IV.

46-3. Regulations pertinent to ORV area classifications of "open, closed or restricted" should be in effect in early 1978. The BLM Rio Puerco area will then be inventoried and evaluated for official designation of ORV areas.

46-4. Each individual livestock operator was given an opportunity to review and provide input into our management proposal for his allotment. In some cases, individuals were unable to meet with us to discuss the proposal.

The New Mexico Department of Game and Fish provided information showing critical ranges for wildlife and supplying numbers for many areas.

The U.S. Fish and Wildlife Service, under a cooperative work agreement, surveyed the area for non-game species and threatened and endangered species.

46-5. We set specific objectives for each individual allotment in our allotment management plans. (We could not include all of them

Response to Comments from the Society for Range Management, Continued

in the ES.) In order to show how we would accomplish our objectives, it was necessary to prescribe specific grazing systems.

46-6. The Council on Environmental Quality (CEQ) requires that the public review period be no less than 45 days, with extensions up to 15 days permitted. No extension was requested, however, comments were accepted for a total of 71 days (through the first week in October).

47

A.D. Brownfield, Jr., President
John V. Brownfield, Vice President
Martha L. Brownfield, Secretary

GOODSIGHT, INC.
'Propriety; Perhaps Profit'

A.D. Brownfield III
Nancy R. Brownfield
Marsha M. Brownfield

Star Route 2 - Box 28
Deming, New Mexico 88030

9-9-77

Mr. Rodney Harris
Bureau of Land Management
3550 Pan American Freeway N. E.
Albuquerque, New Mexico
87107

RE: Proposed Rio Puerco Livestock Grazing Management Program

Dear Sir:

47-1 The document referred to represents a very thorough and complete study of the area involved. The description of the proposed action displays a commendable intensity of work and study. Controversy no doubt exists and will continue over individual items of existing range conditions, forage production, erosion condition, and the implementation of forage allocations and grazing systems. This may be alleviated somewhat by definite provisions within the description for allottee consultation and participation regarding these factors, in order that he may maintain that sense of decisive and managerial ability so vital to cooperation. This chapter also leaves the impression that there can be no deviation, or variation from an established grazing system by the allottee, but rather by the BLM and only then after an evaluation of a complete cycle. This undertone should be corrected, for versatility and variability within a system is the rule, rather than the exception to a successful proper range management program in the semi-arid southwest, and frequently changes must be made immediately, without time for consultation or request for permission.

The Environmental Statement capably assays the present management problems through the description of the existing environment. As a projection, the description of the environment without the proposed action appears sound, although continuing educational and technological improvements would no doubt effect considerable change, as with any projection. The same comment is applicable to Chapter III, The Environmental Impacts of the Proposed Action.

With regard to Chapter IV, Mitigating Measures, it would behoove the Department of Interior to determine and utilize direct financial assistance for those adversely affected by Impact 94 until such time as the benefits of the proposed action overcomes such adversities. The same assistance, in the form of final restitution, should be planned for the adverse impacts No. 109 and No. 113 in Chapter V, Adverse Impacts That Cannot Be Avoided.

47-2 In Chapter VIII, Alternatives to the Proposed Action, alternative (1) No Action assumes that those practices which have a negative contribution to the environment will remain static, and the projections are based upon this fact. This assumption is incorrect in that any and all factors which contribute to any environment are dynamic, and the status quo of their contribution can never be arrested at any given point. Again, this alternative does not allow for increased positive user contribution as educational and technological factors improve. Alternative (2) no grazing, should not be considered; the socio-economic impact analysis of this alternative is ample reason for its rejection. Alternatives (3) short-term non use, (4) forage maximization and (5) pasture level stocking are viable and have their own beneficial characteristics for use within the proposed action in order to further the attainment of proper range management.

47-3 It is ironic that, of those units of government consulted in preparation of the draft ES, the local Natural Resource Conservation Districts appear to have been omitted. Since these bodies have long worked with the BLM, informally and through memoranda of understanding, have labored for many years to foster the use of soil and water conservation principles and practices which assist the BLM in its tasks, and who represent the individual cooperators who will be most affected by the proposed actions, this

A.D. Brownfield, Jr., President
John V. Brownfield, Vice President
Martha L. Brownfield, Secretary

GOODSIGHT, INC.
'Propriety; Perhaps Profit'

A.D. Brownfield III
Nancy R. Brownfield
Marsha M. Brownfield

Star Route 2 - Box 28
Deming, New Mexico 88030

9-9-77

- 3 -

omission should be rectified. Their knowledge of local individual situations, experience, and public confidence is a valuable source of assistance for both areal and allotment livestock management programs. It may also be of assistance if the Natural Resource Conservation Commission is added to the list of New Mexico State Agencies and the New Mexico Association of Natural Resource Conservation Districts added to the Conservation Organizations from which comments are requested.

Finally, one further chapter should be added to the Statement, entitled "Costs of Preparation". This chapter should fully itemize the total cost and man hours expended in the preparation of this draft and final statement. This is a necessary item in accounting the capital expenditures of the proposed action before returns can properly be calculated, and when the full amount is broadly recognized by those responsible for the fiscal stature of the nation, authority to do the same or a better job in a much less expensive, cumbersome, and publicly irritating fashion may well be forthcoming.

Sincerely,

A. D. Brownfield, Jr.

ADB/mb

Response to Comments from Goodsight, Inc.

47-1. Flexibility is spelled out explicity in individual allotment management plans and the user can, under emergency situations, deviate from this grazing system. All deviations, however, have to be reported by the user.

It is understood that under certain conditions prior notification of certain deviations is unfeasible; e.g. fire, floods, poisonous plants, pest infestation, severe weather conditions.

Changes in class of livestock or adjustment in herd numbers above permitted usage will be allowed only after additional BLM study and evaluation of the allotments to ensure that AMP objectives are being met. Whenever possible, these studies will be conducted jointly with the user by BLM.

47-2. A comparison between the No Action Alternative, the other alternatives, and the proposal is found in Table VIII-1.

The no action alternative addresses improved environmental conditions on AMP areas and declining environmental conditions on the non-AMP areas. It does not assume a static environmental situation.

47-3. The National Resource Conservation Districts were omitted from the consultation and commenters list. This was an oversight and will be rectified in future ESs.

48

Wildlife Management Institute

709 Wire Building, 1000 Vermont Ave., N.W., Washington, D.C. 20005 • 202 / 347-1774

DANIEL A. POOLE
President
L. R. JAHN
Vice-President
L. L. WILLIAMSON
Secretary
IRA N. CABRIELSON
Board Chairman

September 9, 1977

District Manager
Albuquerque District
Bureau of Land Management
3550 Pan American Freeway, N.E.
P.O. Box 6770
Albuquerque, New Mexico 87107

Dear Sir:

The Wildlife Management Institute is pleased to comment on DRAFT ENVIRONMENTAL STATEMENT, THE PROPOSED RIO PUERCO LIVESTOCK GRAZING MANAGEMENT PROGRAM.

We are familiar with this general area of New Mexico and have carefully reviewed the document. Our interest is in wildlife and most of our comments are closely related to wildlife effects of the plan.

48-1 Our greatest objection to the proposal and its court-ordered impact statement is that the major public input into the BLM planning process is requested on operation of livestock grazing, the principal commodity use. The important decisions of land allocation and land use have already been made in the Management Framework plan. The AMPs and Grazing Management Program are geared to the decision that maximum livestock forage production is the highest land use. We cannot always agree with that decision. This is best illustrated by that fact that only 424 acres out of 393,083 acres are allocated to wildlife, and these because of soil, terrain and past overuse (Table 1-1). Rationale for the large grazing program comes directly from MFP (p. I-2).

The statement and analysis are generally sound and discuss the effects of the actions correctly.

We prefer the last alternative "Pasture Level Stocking" as this will give faster vegetative response than the preferred plan. We concur that both will be beneficial to wildlife. Any plan that increases vegetation in this arid area, while maintaining vegetative diversity, cannot help but benefit wildlife.

Unfortunately, the plan and statement overlook some opportunities and have a number of omissions that have a serious affect on wildlife. As already mentioned, land allocated for wildlife, or

48-2-A where wildlife will receive priority use, is much too limited. For example, little is known about big game calving and fawning grounds. These could be seriously affected by the heavy spring livestock use, and information is lacking as to whether the affected animals will move without loss (p. II-30 and III-40).

-B No wildlife habitat enhancement is proposed, other than a few water developments, yet a number of opportunities exist. For example, at least a partial fencing of the acres of riparian habitat could produce dramatic results (p. III-30).

-C Discussions of need for vegetative diversity generally, and especially in the revegetation areas, are adequate. They should be grouped and emphasized early in the report. However, nowhere could we find adequate discussions of needs for cover. Thermal cover should be recognized as a major big game need and included in the management proposals. This is especially true in the Forage Maximization Alternative.

The plan should be written to allow grazing by domestic livestock as a vegetative manipulation tool to benefit wildlife at such times and places that it may be needed. It will be much easier to start this type of management if it is clearly provided in the plan.

-D Not enough wildlife recognition is included in the Forestry sections. The importance of snags to cavity nesters is not considered, and plans allow removal of poor quality and high risk trees which can eliminate snags. In fact, we question whether any harvest of the Ponderosa stands should be allowed. Wildlife values probably exceed commercial values of these stands, which are only marginal for commercial use (p. II-85).

-E Mitigating measures can also be improved. All fences, including existing fences, should be changed to permit antelope passage. Disturbed areas on fence lines, water, etc., should be reseeded with species valuable for wildlife.

-F Heavy use of ORV's exists and more is predicted. Soil disturbance is discussed, but not wildlife harrassment. An active program of ORV control and/or road closures is an integral part of Livestock and Wildlife Management and should be included.

Some specific comments follow:

48-3 p. 1-7, Table 1-2 Grand Total. The 3,427 Wildlife AUMs are based primarily on existing wildlife numbers with modest increases, and ignore opportunities to increase wildlife by habitat enhancement. Once approved, such limited forage allocation will be difficult to increase. We urge larger allocations now (p. 1-37, last paragraph).

48-4 p. II-24, Dietary Overlap, 1st par., line 11, "reduces food availability and indirectly increases competition." Change to "directly."

48-5 p. II-37, Mountain Lion. There has been much work on mountain lion since the home range reference used, Leopold 1933.

48-6 p. II-71, 2nd paragraph. The 46,000 estimated hunter days are very high when compared with Appendix II-6, which has a list of 3,610 hunter days as high for deer.

48-7 p. II-106, Recreation. Projected ORV use in the table seems very high. Were energy shortages and costs considered, or are these straight line projections?

48-8 p. III-39, par. 33. Endangered or threatened plant habitat could also be caused by overgrazing, and good grazing management might be detrimental to some species.

48-9 p. III-39, p. 34. When stating percent waterfowl increase on small stock tanks, it would be helpful if actual beginning and ending use figures were listed.

48-10 p. III-40, 2nd par. What are plans for fencing these tanks and reservoirs?

48-11 p. A-26, Appendix II-A. Definitions of habitat conditions for mule deer cover only forage. No mention is made of thermal or hiding cover.

We urge inclusion of the major suggestions we have made. The plan would then be a good wildlife plan with complete recognition of values and habitat enhancement.

These remarks have been coordinated with William B. Morse, the Institute's Western Representative. Thank you for the opportunity to present these views.

Sincerely,

Daniel A. Poole
President

DAP:jh

Response to Comments from the Wildlife Management Institute

48-1. The 424 acres (plus 96 acres unalloted) mentioned in the comment are areas which did not have a surplus of forage so all of them were reserved for wildlife. The remaining allotments are considered to have sufficient forage to meet the needs of wildlife and a portion of the excess was allocated to livestock.

In establishing forage allocations, 50% of the existing vegetation is reserved to maintain soil and watershed stability. Then, areas deemed unsuitable for grazing (too rough, too far from water, etc.) are eliminated from consideration. Finally, an estimate is made (based on New Mexico Department of Game and Fish population figures) of the forage needed to sustain existing wildlife populations. This is reserved for wildlife before any of the remainder is allocated as livestock forage.

As wildlife habitat improves under the management system, the accompanying increase in wildlife populations will be evaluated and forage allocation will be increased accordingly.

48-2. a. The BLM and New Mexico Department of Game and Fish have not as yet been able to locate specific calving and fawning grounds within the ES area.

b. Several measures of the ES proposal do enhance wildlife habitat. See Tables I-2 and I-6, and page I-9 for further discussion and examples of positive benefits to wildlife habitat.

c. No significant impact on thermal cover is expected from the proposal. The removal of cover for wildlife habitat is addressed in Chapter VIII, Impacts 6 and 7 of the Forage Maximization Alternative.

d. Chapter II describes the existing situation, including both forestry and wildlife. Snags in the area are not expected to be affected by the proposed action.

e. Mitigating measures benefitting wildlife include those numbered 36, 40, 50 and 63 of Chapter IV. Overall, the proposal is benefical to wildlife (see the comparison in Table VIII-1).

f. See the response to comment number 46-3.

48-3. The New Mexico Department of Game and Fish provided the population figures used in the ES.

As habitat conditions improve under the management plan, reassessment of wildlife needs will be made jointly with the Department on the basis of observed population increases. Information from other sources will be considered in the anlaysis for future management of wildlife habitat.

See also the response to comment number 48-1.

48-4. The change has been made in the text.

48-5. The literature references are old, but still valid. Additional reference material was reviewed and was found to contain the same information.

48-6. The figures in Appendix II-6 refer to big game hunting only, while the figure of 46,000 hunter days on page II-71 includes all types of hunting (small game, big game, and non-game, including birds).

48-7. The figure for ORV use in the ES is a straightline projection based on the data available at this time.

48-8. As is stated on page II-24, under "Threatened and Endangered Plant Species," the present state of knowledge about these plants is such that "virtually nothing is known of the requirements for these species to live and reproduce."

This problem is further addressed in the ES in Chapter IV-2, Table IV-1, Mitigating Measures (Vegetation--Number 33, Alteration of Threatened and Endangered Plants). Basically, more on-the-ground studies are needed to determine how to prevent further depletion of these plants by grazing management.

48-9. We have included the numbers for our projected increase later in the paragraph, ". . . it is assumed that the present estimated use of 200 to 250 ducks and shorebirds per pit tank would double after implementation of the proposed AMPs . . ." Table VIII-1 is a comparison of the existing environment with the proposal and its alternatives, showing total use figures for waterfowl.

48-10. The ES contains no plans for fencing the existing waters. The grazing system designed for each allotment provides for periodic rest from livestock use and thus eliminates the need for fencing each water facility. As outlined on Page I-19 (Progress Checks) each AMP will be evaluated. The evaluation may indicate the need for additional fencing.

48-11. An investigation into the adequacy of the thermal or hiding cover was beyond the scope of the forage inventories conducted for preparation of the ES.

Subjective evaluations made by Bureau personnel indicate that cover is available in sufficient quantity and proper juxtaposition to meet the needs of mule deer throughout their occupied range in the ES area.

49

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

DEPARTMENT OF ANIMAL AND RANGE SCIENCES
Box 3-I/Las Cruces, New Mexico 88003
Telephone (505) 646-2514

September 12, 1977

Mr. Rodney Harris
Acting District Manager
Bureau of Land Management
3550 Pan American Freeway, N.E.
P. O. Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Harris:

Considering time constraints, priorities of court orders and legal protocol of impact statement writing, the Rio Puerco FIS has put together a reasonable document. It is unfortunate that time has not allowed for the full development of grazing management values and procedures.

49-1 A lack of data for the Rio Puerco management area is apparent. A single field survey was conducted without any variation presented to show the error of the sampling technique or annual variations as encountered from year to year in semi-arid conditions. This leaves vegetative trend in a state of quandry as it is impossible to correlate to the status of prior years. Through areas of non-use and the San Luis watershed study area, it is possible to make comparative evaluations of what many of the areas should be or are capable of becoming.

Many of the proposed vegetational changes through improved grazing management are relaistic but impossible to measure. Sampling procedures at the time of the survey in 1975 have an error greater than the anticipated vegetational change. Much additional data, especially on

production, are needed to provide more factual information that can be interpreted as a measure of the success of the program through time.

The proposal recommends a rest rotation grazing management program with several grazing alternatives. All programs are prescription management or "cookbook" procedures which blanket the entire Rio Puerco area with little regard to the vegetative base, the pastoral needs or desires of operators. All programs are based on calendar moves from pasture to pasture. From a survey of the enclosed visuals, there seems to be a reasonable inequity between carrying capacities of individual pastures and many of the pastures located within a given allotment will require substantial movement of livestock.

An evaluation of the existing AMP's on the Rio Puerco which utilize prescription management programs shows 50% of the allotment plans need a livestock reduction. Where no grazing management plans are implemented the allotments needing livestock reduction are approximately 70%. This alone would indicate something about prescription management.

Through the time available for writing, it appears that the EIS team did not find time to evaluate and document information known about general range management and grazing systems responses. This is apparent when one evaluates the literature cited in these areas in relation to woldlife, birds, recreation, etc. 49-2 Information in the literature would show prescription management plans are not highly successful in the Southwest, and that maximum flexibility in a grazing system is imperative. With the dominant species of plants present in the area, a routine twenty month rest period is not necessary for range restoration.

49-2 Summer rest may be the most desirable situation for many of the important forage species. For others, fall or winter rest may be more desirable. Specific rest requirements can be obtained by simple flexible deferment schemes.

While replenishment of food reserves is important, the development of correct morphology for optimization of leaf area and vegetative reproduction of desirable species is essential for grazing management to work. This cannot be done by prescription management on pastures of unequal carrying capacity with specified movements based on specific months of the year. Also, no consideration has been made of species preference by livestock. In many cases, preference for selected species (i.e., Atriplex canescens) in the winter and spring but not in the summer and fall can be incorporated into the rest program of individual species. Research data shows a 20 month rest is not necessary for optimim vigor of this species. In general, grazing management systems must take into account all ecological and managerial aspects and incorporate them into a flexible program for the benefit of a given land unit.

49-3 The forage base available within allotments for implementing the grazing system is not expressed. It is essential that AUM's of grazing be no greater than the forage will support. It is doubtful that enough forage can be developed without a flexible grazing system to sustain grazing through the first year. Should a drought occur after the necessary heavy grazing on selected pastures in the rest rotation system, the results could be disastrous to the vegetation. The philosophy of the Hormay system, which the prescription management program follows, is that increased heavy grazing for another year or more during which the system is being implemented cannot cause more harm to the vegetation. This concept may hold validity in the North where moisture is more dependable, but can result in ruin in the Southwest where moisture is more erratic.

49-4

The lack of vegetative manipulation to improve forage conditions and return an ecological stability is confusing. The development of vegetation and animal populations occurred together at an early age on this planet. One does not know what vegetative impacts were created through time by native animals. Through this development evolved a floristic pattern considered pristine by today's standards. Only recently in man's history have we seen the domestication of livestock and more recently the situation of over-grazing and abuse of the land as we understand it. This situation was a result of political times and a lack of understanding with regard to the physiological needs of the vegetation. The alterations of the vegetation took several decades and in many cases resulted in changes that may not be possible to restore to the pristine situation. Also separation of man induced and natural geological activity are not clear. One definitely should not expect instantaneous results from a management system. Sagebrush and pinon-juniper have increased through over-grazing. The current ecological status is not pristine and

grazing management alone will not alter this vegetative situation in the near future. However, a judicious brush control program can alter the
49-5 vegetation toward a pristine condition which will do more for improving carrying capacity than any other factor except possibly water development. This means control and not eradication which would leave sagebrush and pinon-juniper scattered throughout the area, but in lesser densities than currently are found. While this may reduce the numbers of associated species of birds, the diversity of species should remain similar and it should not reduce the level beyond pristine conditions.

These are some of the shortcomings present in the document. The Bureau is aware of many of these problems, but time available for preparation has not allowed for proper presentation of information known. The premise that vegetation can be used perpetually for grazing while simultaneously providing society with high quality air and water, open space and recreation needs to be emphasized. Hopefully, grazing management can be put into perspective to show how it will work and be of greater ecological benefit to society and that the above items will be properly addressed in the final document.

Sincerely,

Gary B. Donart
Associate Professor
Range Science

GBD/dts

Response to Comments from Gary B. Donart (Department of Animal and Range Sciences, New Mexico State University)

49-1. Vegetative trend data was not available. However, the resource inventory completed in 1975 determined forage production levels, which were used as a basis for initial stocking in the development of management systems (see response to comment number 14). Trend is one of several tools, including actual use, utilization and climatic data, which will be used in analyzing each AMP after completion of a grazing cycle.

49-2. Grazing systems are designed to provide for the continuing physiological needs of the vegetation found on each allotment of the ES area. Figure I-1 (Four Year Rest Rotation Grazing System) shows specific rest periods in every season. Rest periods up to 16-1/2 months are used; however, most rest periods are much shorter.

49-3. Table I-2, Column 11, "Livestock AUMs Available," shows the forage base available for livestock within each allotment.

49-4. A typical four-pasture rest rotation system can be seen on page I-18 of the ES. As shown therein, the most critical period for utilization would be in Year 1 on Pasture 2, where only three-fourth's of a year's crop would be available when the cattle came back onto the pasture during the fall (Treatment B).

In formulating the grazing systems to avoid excessive utilization, BLM has used the theory that approximately one-half of the previous year's forage crop is carried over and available during the present year's spring. One-fourth of the present year's forage is produced during the spring, and three-fourths of the present year's forage are produced during the summer.

Therefore, during the spring (March 1 through approximately June 30) there are three-fourths of a year's forage crop available for utilization (1/2 carryover plus 1/4 spring growth). If the pasture is rested during the spring and grazed during the summer (July 1 through September 30), there is a full year's crop available for grazing (1/4 spring growth plus 3/4 summer growth). If the pasture is rested in the spring and summer, then a full year's crop is available in the fall (1/4 spring plus 3/4 summer). If the pasture is grazed in the spring and then rested during the summer, only three-fourths of a year's crop is available in the fall.

49-5. Vegetative manipulation and the impacts of it are addressed in the Forage Maximization Alternative in Chapter VIII.

50

THE NEW MEXICO NATURAL HISTORY INSTITUTE
A Nonprofit Corporation
Box 369, St. Johns College
Santa Fe, New Mexico 87501

12 September 1977

District Manager
Albuquerque District
Bureau of Land Management
P. O. Box 6770
Albuquerque, New Mexico 87107

Sir:

The Natural History Institute is a group interested in New Mexico's natural environment--its description and its protection. Most of us are biologists at the state's universities and colleges. We here comment from an ecological standpoint on "The Proposed Rio Puerco Livestock Grazing Management Program."

The program is, in general, a fine one in our judgment, not only as to most of the actions proposed but also as to the underlying goals, the data base, and the presentation. Whether it will really bring about a doubling of forage in 22 short years without more manipulation seems questionable, but there is no harm in trying! We would oppose more extensive manipulation, particularly pinyon-juniper eradication, unless methods (such as fire?) are found that are less harmful and more effective than those used in the past.

50-1 Our major area of disappointment is that the greatly increased attention to wildlife (in comparison with previous programs) is wedded so closely to the principle that wildlife and livestock grazing are fully compatible uses (p. VIII-25 and elsewhere). Not that we disbelieve the principle--it is a good one. But it is not completely true in all ecological ramifications. Therefore, we think that significant acreage should be reserved for wildlife alone; that is, there should be natural areas. In such areas biological diversity would increase differently from--and more than--in areas grazed by livestock. Your reservation of a few depauperate allotments totaling 520 acres (13/100 of 1% of the total) is not significant even as a gesture in the direction we are suggesting.

We think that the Bureau has important obligations additional to its traditional "No. 1" of serving the livestock industry, and one of those duties is to play a role in preservation of natural ecosystems on national resource lands. We do not claim that preservation should be the Bureau's primary goal, as it should be for the Park Service. But the Bureau controls much more land than other agencies, and thus has many opportunities, often unique, to preserve particular ecosystems of the unglamorous low-elevation types that aren't put in national parks. In the long run we don't think it unreasonable that 10% of national resource land should be freed of livestock for recreational and natural-area uses. In the short run, at least on the Rio Puerco, that may be too high a figure. But maybe 5%--including some productive, valley-bottom land?

Perhaps our point could be made in another way. Your "Alternatives to the Proposed Action" presents "No Grazing." Your chosen program is "100% grazing." We think that the right figure lies between, probably "90 or 95% grazing." We are aware of the complex ecological results for ungrazed areas, including, perhaps, reduced vegetative cover and increased intensity of fires (though, as your statement fails to mention, increased intensity can and should be mitigated by increased frequency of fires). These effects, in our judgment, are nearly all desirable, and the rest are acceptable, if we are talking about 5-10% of the statement area's acreage.

50-2 Another point: we would also like to support the Wilderness Society's suggestion (p. IX-2) that an area adjacent to national forest land be considered for addition to the wilderness system. This action has fewer implications that "natural area" designation, since it primarily concerns vehicles, not livestock. Inasmuch as the Bureau is now mandated to consider wilderness status for appropriate roadless areas, we are surprised to find no reaction to the Society's suggestion in Chapter VIII.

We want to remind you of this letter's first emphasis: the Rio Puerco plan shows that the Bureau is moving in the right direction!

Sincerely,

Roger S. Peterson
for the Institute

Response to Comment from the
New Mexico Natural History Institute

50-1. See the response to comment number 48-1.

50-2. The wilderness inventory in accordance with Section 603 (a) of the Federal Land Policy and Management Act (FLPMA) has not been completed on the public lands that would be impacted by the proposal. Prior to implementation of any action, the areas will have to be inventoried and impacts on potential or existing wilderness areas assessed. Until Congress acts on an area that has been designated for wilderness study, existing multiple use activities, including grazing and supporting activities, will continue. New uses or expanded existing uses will be allowed if the impact will not impair the suitability of the area for wilderness.

51

P. O. Box 12
La Jara, New Mexico 87027
September 12, 1977

Mr. Rodney Harris, and
Mr. J. C. Whitney
Bureau of Land Management
3550 Pan-American Highway
Albuquerque, New Mexico

Dear Sirs:

Please allow me to express some thoughts regarding some proposals in the Rio Puerco EIS and how they will affect the Gutierrez Family in the North Divide Allotment. A number of facts were presented to you July 15, 1976 (copy attached) which are still pertinent and which I would like to make a part of these comments. At the risk of being repetitious some facts will be re-stated for emphasis or because of the air-of-anxiety in knowing the final outcome of some of the proposals. I am aware that the time may not be mature for final decisions, precisely the reason for furnishing additional information that might be pertinent.

The combining of the North and South Divide Allotments is still a very serious problem with us, the three permittees of North Divide. Yearlong grazing, which is what it will be, after combining the two allotments, will be setting back the progress made under an AMP in the North Divide. The root system of most plants, including noxious weeds, has been established. A more objective evaluation of the forage available could be made now, even with sparse, spotty rainfall during this growing season and none for winter months, than was made in 1975. A more realistic, error-free, less subject to regret or adjustment conclusion could be reached, plus gainful experience and data that will serve to do research on future forage production.

The unanimous recommendation by the Multiple-Use Advisory Board upon their survey of the allotment, review of use practices, management practices and general criteria for maintaining a viable, productive allotment was not to combine North and South Divide Allotments. Has this recommendation been ignored? The EIS maps and discussion show that it is going to be done. I would recommend that a thorough search of the facts be made, and serious consideration be given to the effective functioning of management plans, operating regulations, and permit transfer policies in the light of a diversity of opinion, personal conflicts and negative attitude promulgated by changes in the EIS. The same permittees were one unit allotment prior to 1967, and it took 6 years to get a separation of allotments for these very reasons, I am now trying to avoid repeating, and undoubtedly are a part of BLM files. If you wish that the North Divide continues to make progress, achieve its objectives under the EIS, and become one of the leading allotments in the Rio Puerco Area, don't combine it with any allotment.

The forage allocation (84 AUMs) to wildlife is proposed on a one-time, set
allocation or else I failed to find where there are any variants. The wildlife
allocation means a cut of 7 head of cows that would produce 7 calves yearly and we
would sell for say $100.00 each meaning that we would be paying $700.00 yearly for
51-1 forage consumed by wildlife. Forage allocation to wildlife seems to have been done
by the "guesstimate formula", there is no supporting evidence or conclusive research
data on the forage requirements of deer the only type of wildlife that make the
North Divide their habitat. Ask me I know, a herd of 14 head of deer in April 1975
was reduced to 6 head by April 1977 by a multitude of poachers imerging from the
west, leaving gates down or making their own, cutting a pattern of roads across the

land that is disastrous. There is a little known to you well established poaching road at the top of the Continental Divide serving this purpose. The lack of predator control is also a contributing diminuation of wildlife factor. I have not seen a fawn out of the 1977 crop yet. Little consideration seems to have been given the foraging habits of wildlife and those of livestock. There is little competition with each other as far as their feeding preferences, likes or dislikes of forage, are concerned, or for habitat: generally deer will stay in the mesa tops or areas of thick cover, areas not preferred by livestock. Wildlife and livestock have co-existed harmoniously for many years without materially competing with each other for the public lands. The very presence of deer in an area testifies to this-if deer find an area uncomfortable to existence they simply migrate. To superimpose a Habitat Management Plan on the AMP may be superfluous, there are only three on the Rio Puerco Area and the EIS does not give clear definitive information for its function and operation. No consideration was given to the deer migration from the Jicarilla Apache Reservation into North Divide or vice versa. The Reservation has some of the best deer country and numbers anywhere. Their hunting seasons generally do not coincide with New Mexico hunting seasons, their dates are earlier, and as soon as the shooting starts the migration starts to North Divide, when the shooting stops they migrate back. I would like to see that a more objective evaluation of wildlife use of the allotment be made.

Forage production goals have been set, and I commend you for your long range
projections but I believe you should have been more definitive in stating how you
are going to accomplish such objectives. The EIS merely mentions "forage mani-
51-2 pulation" which is good if the point of view is broad enough to remove the unpro-
ductive vegetation, such as sage brush. Aerial spraying will be about the only
effective way to conceivably cover the large areas infected on an effective
basis. Noxious weeds, such as cockle-bur, larkspur, locoweed, are competitors
for moisture in the ground and unwanted injurious killers of livestock. These
are more examples of omissions in the EIS.

I have failed to see where the EIS or the regulations have given any con-
sideration to a down-to-earth human relationship. Habits, attitudes, and skills
are the intangible, vital and living, hidden controls of whether any undertaking
51-3 is a success or a failure, and none of these attributes can be legislated or
put forth in regulations. Complete, mutual, free co-operation will move
mountains and make them green again.

Sincerely,

Rudy Gutierrez

Rudy Gutierrez
for: Gutierrez Family

P. O. Box 12
La Jara, New Mexico 87027
July 15, 1976

Mr. Keith Miller, and
Mr. Donnie Sparks
Bureau of Land Management
3550 Pan-American Freeway, N. E.
Albuquerque, New Mexico

Dear Sirs:

The Gutierrez Family, North Divide Allotment Permittees, wish to go on record as being 100% against any merger with any other allotment either because of AMP or EIS preparation or for any other reason. It took from 1960 to 1967 to work out all the obstacles toward the development of an AMP for the North Divide Allotment, which we feel has accomplished its objectives, and is rather successful in operation, implementation, and productivity. There are now three permittees in the North Divide Allotment and there used to be three more, all those in the South Divide Allotment. The division of the allotment came at our insistance because of the diversity of reasons that I will enumerate:

1. We do not do yearlong grazing, our Forest permits take care of the off time June 15 to October 1. The proposed merger with the South Divide Allotment who do yearlong grazing would be a mistake. Range rest during the growing season, particularly during dry years like this one, determine whether an AMP is a success or failure. We feel that the excellent grass root system that has been established on rest rotation deserves a chance.

2. The expense and sacrifice that has gone into the making of the allotment what it is should not be overlooked. We think we should be entitled to recover at least in benefits what took years of work and cash outlay to accomplish. Our file will reveal that under Section 4 permits, class 1 or 2, many projects that date back to 1943 and prior, are evidence of our sincere effort to develop the allotment to what it is today. (Partial list of expense) Barrial tank, 1943, $757.80, Laguna Cuata, 1943, $220.75, Armijo tank, 1946, $855.60, Ranch tank No. 1, 1938, $327.00, Ranch tank No. 2, $680.00, Well and Windmill 1958, $1675.00, Ranch well, 1960, $887.00, Holding Pasture tank, 1960, $477.40, Sec. 5, Pasture 1 tank, 1965, $585.00, Holding Pasture Fence, $480.00. Furnished all wire, posts, 1/2 of labor and use of machines on south and west side of private Section 15 (never remunerated for same.) Wire, posts, 1/2 labor on Taylor-North Divide boundry line from Sec. 9 to Sec. 17, 1960, cost $580.00, N. and S. Divide Allotment division fence (cost shared) $2339.00 (by six permittees) Sage removal, Seed and seeding Sec. 2 and 11, $5536.97 (includes fence).

3. The most important reason for no merger comes in the area of livestock management:
   a. We are crossbreeding with Charolais, Galloway, and Simental bulls (see AMP revision 3/28/71) and believe we will have difficulty in the use of these bulls with others, also our breeding dates are not common to those used locally. Heifer breeding is done earlier than herd breeding, and has been done on the flexibility of pasture use.

   b. The weaning of calves has to a degree, been used and incorporated with grass seed trampling and has worked very well because of the short period of time a pasture is used.

   c. Early calving merits a lot of consideration: Gathering cows into a pasture for observation of calving difficulties, no-milkers, heavy milkers, retained placentas and other problems. A watchful eye is necessary and we feel many of these and other management tools that we use will be lost when the use of an area or separation of animals will not be possible because of animals belonging to others.

We hope you will weigh and consider this request as a valid, sincere effort to continue and to maintain what seven years of operation have done under an AMP; that the prior quarter onetury did not do on the same land, under similar conditions, and with the same people in question.

Sincerely,

Rudy Gutierrez

Response to Comments from Rudy Gutierrez and Family

51-1. The estimate of wildlife use of this allotment is based on the latest New Mexico Department of Game and Fish population figures. It includes use made not only by resident deer, but by those migrating from the Jicarilla Reservation. Wildlife evaluations were a part of the Allotment Management Plan process.

51-2. Methods for accomplishing forage manipulation and production are discussed in Chapter VIII under the Forage Maximization Alternative. See Table VIII-21 which shows the opportunities for vegetative manipulation.

51-3. The BLM recognizes that the livestockman or the original user of the public lands is still the primary user in the Rio Puerco area. He may be embattled, not well understood by the general public, and in economic trouble. The original users under the Taylor Grazing Act are now mostly gone, replaced by heirs or buyers of their property. Some of these new owners are educated in animal husbandry and good practices of range management, but are often faced with the existing poor range condition they inherited and the financial problems of today's marketplace.

Individual management skills vary, but BLM has to consider the area as a whole and determine what is best for all resources, including livestock.

STATE OF NEW MEXICO

STATE PLANNING OFFICE

GREER BUILDING
505 DON GASPAR AVE.
SANTA FE 87503
(505) 827-2073

LEILA ANDREWS
STATE PLANNING OFFICER

JERRY APODACA
GOVERNOR

52

September 6, 1977

Mr. Gordon A. Frashier
Acting District Manager
Bureau of Land Management
Post Office Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Frashier:

I have received the Draft Environmental Statement for the Proposed Rio Puerco Livestock Grazing Management Program and the comments of the Advisory Council on Historic Preservation (August 24, 1977). The Council requests that the Historic Preservation Officer be contacted in the early stages of specific project planning, and that the Advisory Council be afforded an opportunity to comment on individual Environmental Assessment Records. I think this is appropriate, and will review and comment on the EARs as we customarily do. This accords with your response to my comments as summarized in the Statement (IX-3).

52 The Statement does not appear to respond to my recommendation that areawide Management Framework Plans specifically addressed to cultural resource management be written and formalized in the usual way. The question of effect on cultural properties can doubtless be adequately dealt with through reviews of the EARs. The purpose of areawide management plans, however, lies in the ability they could be expected to give us to choose alternatives for development and deal with relative significance over large tracts. This broader planning base would be a basis of comparison which would help us avoid the repetition (for example, of data collection) which always occurs when one site within the area of a project undertaking is dealt with as needed, and mitigation and protection efforts continue in that piecemeal fashion. I take this opportunity once again to commend the recommendation to your attention.

Sincerely,

Thomas W Merlan

Thomas W. Merlan
State Historic
Preservation Officer

TWM:vk

Response to Comment from Thomas W. Merlan,
State Historic Preservation Officer

52. All archaeological information gathered during the environmental process has been incorporated into the planning system documents (URA and MFP). A meeting has been set up for review of those documents by the State Historic Preservation Officer. Site specific environmental assessments and archaeological clearances will continue to be available for review by the State Historic Preservation Officer under established procedures.

53

DAVID H. WEINGARTEN
12413 PLACID, N.E.
ALBUQUERQUE, NEW MEXICO 87112

September 12, 1977

Bureau of Land Management
Attn: Mr. John W. Whitney
3550 Pan American Freeway
P.O. Box 6770
Albuquerque, New Mexico 87107

Subject: Draft Environmental Statement-The Proposed Rio Puerco
Livestock Grazing Management Program

Gentlemen:

The following are my comments on the subject draft ES.

This study was badly needed to document present status of the surface resources, and provide public opportunity to review and comment on management options. In addition the ES makes available research results to help understand conclusions reached in the draft. The summary tables are especially valuable as an assist to comprehension of the report.

The report convinces me that adjustments must be made in grazing practices on the ES area. It is also apparent that some historical users can not enjoy the same level of use of public lands as they have in the past. This is unfortunate but use must be cut to restore range vegetation. This will allow recovery so that in the long term grazing can be again expanded. The proposed action is acceptable to me.

I was pleased to see wildlife impacts evaluated for each of the discussed alternatives. No grazing appears to offer maximum benefits to wildlife and recreation use; however, I feel that multiple use can include grazing and if the proposed action is implemented a reasonable balance will be achieved. Reserving forage for wildlife will be an important part of multiple use.

53 Costs of the proposed action appear high when evaluated against grazing benefits alone. I don't think it is appropriate to expect grazing fees to justify the entire cost of the improvements; rather, factors such as increased life of Elephant Butte Reservoir and increased wildlife harvest must also be considered.

"2"

Irrespective of which management alternative is chosen I suggest that a provision for year around water for wildlife be included in your management plans and implementation. Water is especially critical for antelope and turkey. Also fences constructed should allow antelope passage.

Yours truly,
David Weingarten
David H. Weingarten

Response to Comment from David H. Weingarten

53. Our economic analysis procedures for each grazing allotment considered rancher benefits, wildlife, watershed, and other measurable resource values. It was very difficult to adapt many intangible public benefits (e.g., aesthetics, feelings of solitude) to economic analysis.

54

New Mexico Cattle Growers' Association
2231 RIO GRANDE BLVD., N.W. • BOX 7517
TELEPHONE (505) 247-0584
ALBUQUERQUE, NEW MEXICO 87104

ALBERT J. MITCHELL, PRESIDENT
ALBERT

BILL WARBOIS
EXECUTIVE SECRETARY
ALBUQUERQUE

PHIL HARVEY
FIRST VICE PRESIDENT
CARRIZOZO

VON CAIN
VICE PRESIDENT
MOUNTAINAIR

MRS. JERRY CLAYTON
VICE PRESIDENT
LOVINGTON

F. F. "CHANO" MONTOYA
VICE PRESIDENT
LA PLATA

HARRY F. LEE
SECRETARY-TREASURER
SAN MATEO

September 13, 1977

Bureau of Land Management
P.O. Box 6770
Albuquerque, New Mexico 87107

Dear Sir:

The New Mexico Cattle Growers' Association and the New Mexico Public Lands Council are submitting the following comments on the Draft Environmental Impact Statement, Proposed Livestock Management Program for the Rio Puerco Planning Unit.

These comments are being made jointly representing 4,000 livestock members.

We feel that the following changes and additions to the Environmental Impact Statement must be made to alleviate any adverse economic effects to the already depressed economy of this area, and to further promote the multiple use concept.

Sincerely,

Albert J. Mitchell

Albert J. Mitchell
President

Sincerely,

Bob Jones

Robert Jones
President

AJM:RJ:jv

COMMENTS ON THE RIO PUERCO EIS STATEMENT

The BLM is to be commended for the great effort put into this study considering the time frame they are forced to work under.

We realize also that the time factor caused the hastiness shown in the AMP's; however, for them to be acceptable and workable, they will need to be reworked.

It may be a requirement of the impact writing process, but it seems that the impacts of grazing are lost in the sections concerning other topics such as: Cultural resources, visual resources, transporation techniques and others.

54-1 Livestock comprises 13% of the citations in the reference section and wildlife comprises 30% ... this further shows that grazing and uses of public lands takes second to other considerations.

CHAPTER I - Objectives: (1) The combining of allotments will create many problems non-existent now. How will the cost of improvements, salt and feed be distributed among the permittees? Who will decide what type of feed will be used and where it will be purchased? Who will hire the help to feed, break ice in the winter and repair fences? What will happen when one man raises registered cattle while another wants to continue to cross with exotic new breeds?

(2) The idea of adjusting grazing to existing forage is good; however, no consideration is made of the fact that this area has been in a drought for the past 5 years, so the forage analysis is not a true picture. Also, some room for an increase in AUM's during a wet year should be allowed.

(3) Allotment Management Plans may be necessary in some instances, but why make a good operator whose allotment is in a stable or improving condition change his ranching methods because someone who had a degree in range management, yet has had no practical experience and has very little knowledge of the problems unique to this area, feels the change is necessary.

The use of rotational grazing systems, while being useful in areas where pastures are of equal carrying capacity and sufficient moisture is avaialable, will not work in New Mexico because livestock must be able to move to the area where rain has been sufficient to promote plant growth or they will suffer, and equally important the existing plant life will suffer.

The Allotment Management Plans must have some flexibility written in them to promote proper forage use as well as economical livestock grazing.

54-2 The mandatory inclusion of private and state lands in AMP's is not only unncessary, but unlawful. If this is done, litigation is sure to arise because it is unconstitutional, violates States Enabling Act and violates the individual's Civil Rights (42 dsc 1983). This should only be done on a voluntary basis, and then only when it is absolutely necessary.

CHAPTER I - Objectives: (3) continued:

54-3 Mechanical erosion control is not mentioned. Mechanical methods have been used extensively on private and state lands, and have proven to be highly beneficial.

(4) Many of these range improvements will be beneficial; however, not enough research into the feasibility of many of these has been done.

54-4 Well locations were established without proper research of the available water. A good seismographical survey of the underground water in this area would be extremely beneficial. A 10,000 gallon water storage may be inadequate in hot summer months when windmills may not pump for 2 to 3 days.

54-5 The fences as described in many areas will not be sufficient to contain and/or restrain livestock. As a result, problems of trespass will arise as well as prevent many necessary livestock management practices such as separating bulls and cows until proper time when a uniform calf crop can be maintained.

If the permittee is going to be responsible for maintenance of improvements, they should be consulted as to the type of construction and should be paid to maintain wildlife management improvements since the permittee receives no benefit from them.

What allowance for trespass due to poor quality fence construction will be made? This is essential as trespass due to the game passage type fences is sure to occur. In theory, the separate wildlife waters is great, but who is going to tell the wildlife to use them rather then the livestock tanks?

54-6 While brush control is mentioned in the study, no consideration is given to control of poisonous plants which are detrimental not only to livestock but wildlife as well.

CHAPTER I - Proposed Allotments:

While in a very few cases combining allotments may be beneficial; most cases will result in utter chaos! Combination of existing allotments into one would be like forcing two businesses to share the same building, rooms and resources. This would create many management problems which we have discussed earlier.

Again, we want to stress the fact that mandatory inclusion of private and state lands is unconstitutional and violates personal property rights.

CHAPTER II - Much work has gone into this section and much of the data is correct. The people who developed it are to be commended. Especially when you consider the short time they were allowed to do the great amount of research required to compile this data. However, many questions became evident to us after studying the data:

54-7 1. One analysis of the available forage is insufficient to get a proper prospective of the available forage since the plant growth varies from year to year depending on the rainfall and the

CHAPTER II - #1 second paragraph continued:

54-7 season of the year, especially annual forage plants.

2. Since the amount of underground water is unknown, a good seismographic survey should be done so good water management practices can be applied.

54-8 3. Since only 75 antelope occupy this area (the study shows the population is at carrying capacity for the forage) why must all fences in the area meet antelope fence standards, and what type of research has been done to perfect antelope fences as to alleviate problems that will occur?

54-9 CHAPTER II - Vegetation: In this section, it states "Acres without AMP's would deteriorate". This is very broad and cannot be considered true as in many areas the environmental impact statement reports the range is stable to improving, and AMP's have not been implemented.

CHAPTER III - In general this area is based on assumptions and not on scientific fact. They attempt to compare this area to studies in other areas and this cannot be done due to the uniqueness of this area. Again, the environmental impact statement is assuming that forage would increase with the rest-rotation grazing system without proper research to provide this data. Experience has shown that the honorary rest-rotation system, as proposed, has not been shown to be overly successful in the Southwest.

This area also bases its assumptions on one range survey taken during a drought period rather than several surveys done both in good and bad years.

CHAPTER VIII - No Action: (1) The no action proposal would be disastrous, and while many of the proposals are in the infancy stage, to not progressively act on known deterrents of the public lands would be to admit that we are not a dynamic society. Response or no response to these stimuli inadvertently affects us all, either positively or negatively. To some of us the status quo suffices, but change we will, and change we must, but change has to be orderly and practical to promote its own perpetuation. Drastic errors or penalties to its promoters retards or nullifies the effort because the spark of life, the will to do, has been quenched.

No Grazing: (2) The no grazing proposal would have many obvious implications too numberous and too drastic to enumerate-suffice to say that in the end, no basic objective would be accomplished. A renewable, natural resource would not be harvested and would just compound the fire danger. All plants need pruning for growth stimulus and with the livestock not being there, plants would degenerate and forage production would decrease

Short Term Non Use: (3) There is a misnomer for this term; it implies that livestock will have to be removed from an area and grazing either partially or totally eliminated. This may be or may not be so in some instances, but in general the reference is toward a grazing schedule on a rest-graze pattern, month by month, four year rotation basis for each pasture. Table VIII-16 of the EIS, page VIII-34 will bear this out. The caution here is that there will not be flexibility built into this system to take care of unforeseen, unpredictable occurrences, or that we marry a

CHAPTER VIII - Short Term Non Use (3) continued:

system of this type to the total exclusion of other workable types of grazing system that will promote the objectives. The trade-off proposals outlined in Table VI-1 seem logical, and some degree of sacrifice has to be tolerated to accomplish the long term proposals or objectives.

Pasture Level Stocking (4) There is considerable merit in this practice of grazing. Unfortunately, there are a number of variables that discourage its use, but there would be the additional incentive in the permittee to promote the objectives if he was allowed increased license during times of abundant forage and out backs during scarcity. Over a period of time an average income, as well as an average stocking level would be derived that would enhance the forage production level as well as the permittee's income.

Thank you.

Response to Comments from the
New Mexico Cattle Growers' Association

54-1. See the response to comment number 18.

54-2. See the response to comment number 29.

54-3. It is recognized that in a few extremely eroded sites, mechanical erosion control may be needed. As the objectives of each AMP are evaluated, more specific problem areas may be identified. However, widespread use of this costly measure should not be necessary once the grazing systems have been implemented.

54-4. Feasibility studies for proposed well sites are conducted by both U.S. Geological Survey personnel and private consulting geologists. These people are professionals in their field and made recommendations on each site location.

Response to Comments from the
New Mexico Cattle Growers' Association, Continued

54-5. See the response to comment number 28.

54-6. Refer to the response to comment number 10.

54-7. Except for a few designated ephemeral ranges in Arizona and California, the Bureau does not manage annual forbs or weeds. These plants cannot be depended on each year for forage. If abundant rainfall occurs during the right time of the year and there is an abundance of annual forbs or weeds, this may be a short-term bonus.

Capacity estimates of the 1975 forage survey are only a starting point in management. (Also see response to comment number 14.) We will follow the 1975 inventory with continuous actual use, utilization, climate, range trend, and other studies to follow up the survey and adjust the initially established grazing capacity.

54-8. The ES does not state that forage quantity is the limiting factor affecting antelope population in the area. It presents several factors which could be limiting singly or in combination: poaching, low annual precipitation, and early spring forage availability.

Also, see the response to comment 3.

54-9. On specific sites in certain allotments, range condition would not decline without AMPs in the future. However, the overall trend would be toward deterioration. Table III-11 (page III-38) displays this trend, with 62,044 non-AMP acres presently in good condition, and 9,648 acres in good condition as of the year 2000.

55

COOPERATIVE EXTENSION SERVICE

NEW MEXICO STATE UNIVERSITY

BOX 3AE, LAS CRUCES, NEW MEXICO 88003
COLLEGE OF AGRICULTURE AND HOME ECONOMICS

September 13, 1977

Mr. Rodney Harris
Acting District Manager
Bureau of Land Management
3550 Pan American Freeway NE
P.O. Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Harris:

Enclosed are my comments concerning the draft environmental statement on the proposed Rio Puerco Livestock Grazing Management Program dated July 28, 1977.

I trust the comments will be both constructive and useful in the preparation of the final statement. Thank you for your consideration.

Respectfully,

Jerry G. Schickedanz,
Range Management Specialist

JGS/bl
enclosure

New Mexico State University is an equal opportunity employer. All programs are available to everyone regardless of race, color, or national origin. New Mexico State University and the U.S. Department of Agriculture cooperating.

Comments Prepared by Jerry G. Schickedanz, Ph.D.
Extension Range Management Specialist
New Mexico State University
Draft Environmental Statement
Proposed Rio Puerco Livestock Grazing
Management Program, September 13, 1977

The Bureau of Land Management Environmental Impact Team has done a remarkable job in completing the preliminary draft statement within the time restraints placed by the court order. Although this has left some shortcomings and deficiencies within the statement in trying to meet the time requirements placed upon the bureau.

55-1 One noticeable deficiency within the statement is the lack of base information. The one year forage inventory is used with many far reaching implications. The one year's information that was obtained is used to calculate allotment AUM's increase or decrease. The information has been interpreted as absolute with no indication of sampling variation. How valid can a four percent increase in AUM's be when sampling error may be plus or minus 10 percent. (Table II-45)

The inverse is also true in that how valid are decreases of this magnitude? It seems that the increases may be no more valid than the decreases in terms of one-year's data.

The validity of the one years data also carries into the anticipated vegetational changes by the year 2000. The proposed changes through grazing management seem realistic but may be impossible to measure due to sampling error, (Table I-4).

Further sampling may substantiate the data base obtained in 1975, but many of the allotments may not attain the proposed vegetational improvements in ground cover and condition class by the amounts anticipated due to sample error. This is something that will have to be monitered closely in order to determine whether the AMP has been a success or failure.

New Mexico State University is an equal opportunity employer. All programs are available to everyone regardless of race,

55-2 Another deficiency within the proposed action is the blanket application of rest-rotation grazing systems on 51 out of the 57 grazed allotments. Does the bureau have a directive that states "rest-rotation systems must be applied on bureau lands"? If not, then it seems the EIS team did not adequately survey the literature for there are other types of systems that would be applicable to the Rio Puerco area. Literature does not bear out that the rest-rotation system is very successful in the arid Southwest. It would seem to be more judicious to tailor systems to the individual allotments instead of blanket application of rest-rotation to the majority of the allotments. The one and two pasture rest-rotation systems proposed in Table I-2 are really seasonal deferment.

55-3 In reading the EIS, no indication of livestock forage balance by pastures is shown in order to make the systems work. The Hormay rest-rotation system requires that the pastures be of equal carrying capacity and comparable vegetation types. It can not be determined that this requirement has been satisfied in all cases. In looking at visuals A, B, and C showing the proposed combination of allotments, improvements, pastures, and vegetation types, many problems can be predicted. For example, allotment number 50, Ignacio Chavez Grant a 7 pasture rest-rotation system, pasture size ranges from approximately 100 acres to 10 sections. Allotment number 10, Brandy - a 6 pasture rest-rotation, pasture size ranges from 1 section to 10 sections. The Brandy allotment seems to be scattered over a larger area than most other community allotments. This will create problems in livestock movement and intensity of the management. It would seem that keeping the grazing systems more simplified and maintaining flexibility would be more feasible.

There seems to be "more paintings than pictures in range management" and this would apply to some of the proposed management systems. Table II-45 shows that rest-rotation grazing systems have not been overly successful in the Rio Puerco area. Assuming that the 1975 forage inventory was correct, then allotments with implemented AMP's show 45 percent need an increase in AUM's and 45 percent need a decrease and 10 percent need no change. On allotments without SMP's 26 percent need an increase, 65 percent need a decrease and 10 percent no change. The batting average for implemented AMP's is not that much greater than under no AMP's. This fact alone should indicate a change is needed in prescribing rest-rotation systems on the Rio Puerco area.

Specific comments on various topics throughout the EIS.

55-4 Page I-2 Reference is made to 21 implemented AMP's. This is in conflict to information on Table II-45, page II-108 where 22 allotments are shown as having implemented AMP's.

55-5 Table I-2 Tres Hermanos allotment, season of use is not shown for this allotment.

Page I-39 - Fish and wildlife service paragraph. "Predatory animals and rodents may be controlled on public land when damages to other resources can be demonstrated." Question: Are livestock a resource or a use?

55-6 Page II-20 - Broom snakeweed type should not be classed as a vegetative type, but as a condition class of the shortgrass vegetative type. Broom snakeweed seems to be more of an opportunistic plant taking advantages of drouth and followed by favorable growing conditions and then phasing out after a period of time.

55-7 Table II-9, page II-25 - Arrow grass Triglochin martina should be included in the list of poisonous plants found in the Rio Puerco ES area.

55-8 Page II-30 - Literature citations of personal communication Raught and Gerald Gates need to be referenced in the literature citation section.

55-9 Page II-31, Figure II-11 - The sources are not referenced in the literature citation section. Is the Elk versus Cattle dietary overlap due to time of the year or actual dietary overlap for the time period shown on the chart? This comment is also noted on Page II-24.

Page II-42 - Reference noting 30 percent increase per year of the coyote population. This fact alone may have a large part in determining of future wildlife populations and not forage allocation.

55-10 Page II-44 Citation is not referenced in the literature citation section.

Page II-85 in reference to increasing of Pinyon Juniper woodlands. Should not more emphasis be placed on controlling the invasion of the Pinyon Juniper type through vegetative manipulations rather than grazing management practices? Literature does not bear out that grazing management will stop Pinyon Juniper invasions once they have become established.

55-11 Page II-106 "Overall total projected forage production including both AMP and non AMP allotments would decrease 100 AUM's by the year 2000". Is this a correct statement? The 100 AUM's seems to be a very small loss compared to the costs proposed in to the Rio Puerco area in terms of improvements.

55-12 Page III-57 "Footnote table III-18" should be III-16.

Page VIII-37 "Dahl's conclusions are based on the extensive interpretation of many years of vegetative data and are supported by hundreds of other studies". Shouldn't the rest-rotation system as proposed be backed up by
55-13 the same sort of data? Appendix III-3, page VIII-65 - The title on this page is not proper. These are livestock preference classes, not range condition classes.

Response to Comments from Jerry Schickedanz,
(Cooperative Extension Service, New Mexico State University)

55-1. See response to comment number 14.

55-2. See response to comment numbers 15 and 16.

55-3. See response to comment number 17.

Response to Comments from Jerry Schickedanz, (Cooperative Extension Service, New Mexico State University), Continued

55-4. On page I-2 it says there are 21 existing AMPs implemented, while Table II-45 has 42 listed. This is because allotment numbers 38 and 41 are combined under one AMP. This has now been noted on Table II-45.

55-5. The season of use for the Tres Hermanos Allotment is November 1 to June 15. Table I-2 has been corrected.

55-6. The explanation of the Bureau's use of types and subtypes is located on page II-15 of the ES. It is recognized that there are other ways of classifying vegetation. However, vegetation was classified in the ES in accordance with BLM Manual designations based on aspect.

55-7. Table II-9, which lists poisonous plants found in the Rio Puerco area, has been revised to include Arrow grass.

55-8. These have been added to the reference section.

55-9. These sources have been added.

55-10. It has been added to the references.

55-11. Without implementing the proposal, two conditions would exist: (1) improvement on areas with existing AMPs and (2) continued deterioration on areas without AMPs. The net effect would be a small overall change in AUMs. Table II-45 shows AUM changes for specific allotments, and is broken down into AMP and non-AMP areas. Table II-46 contains information on changes in the number of ranches by size (income impacts on non-AMP allotments).

55-12. The text has been changed.

55-13. The titles on pages A-56 and A-57 have been changed to clarify. Both pages must be read to understand the methodology. The order of these two pages has also been changed.

56

The Wilderness Society

P.O. Box 38, Glenwood, New Mexico 88039
(505) 539-2645
Southwest Regional Representative
New Mexico • Arizona • West Texas

September 13, 1977

Mr. Rodney Harris
Acting District Manager
Bureau of Land Management
3550 Pan American Freeway NE
PO Box 6770
Albuquerque, NM 87107

Dear Mr. Harris

I would like to commend the BLM for quite a good DES on the proposed Rio Puerco Livestock Grazing Management Program. If the program is carried out, it appears that the economic condition of the permittees will improve as will the health of the land.

56 **The principal defect in the statement, and it is a major failing, is the poor consideration given to wilderness values. Your Recreation Rating Areas simply do not give a usable picture of where wilderness values might lie in the Rio Puerco ES Area or what their importance might be. It would seem to me that the best way to consider wilderness values would have been to inventory individual roadless areas of over 5000 acres in the area and then consider any conflicting values and uses along with the degree of wilderness value present.**

If areas in the Rio Puerco ES Area are considered for, and eventually designated as, wilderness, this could have an impact on the grazing program for the area. It would seem wise to coordinate your mandates for wilderness review and grazing statements so that conflicts do not appear further along in the decision making process.

Conservation groups in New Mexico are very interested in the wilderness possibilities for the Ignacio Chavez Grant area as it is adjacent to the Forest Service Guadalupe Canyon area. We also are interested in whether an area suitable for wilderness exists in the Mineral Springs area. These questions should be more fully explored in the final DES, along with a better inventory of whether any additional potential wilderness exists in the Rio Puerco area.

Sincerely

Dave Foreman
Southwest Representative

"In Wildness is the Preservation of the World." — Thoreau

Response to Comment from the Wilderness Society

56. See response to comment number 50-2.

57

La Jara, New Mexico
September 12, 1977

Bureau of Land Management
3550 Pan American Highway N. E.
Albuquerque, New Mexico

Attn: Mr. Whitney:

At the meeting the other night with Spenser and La Casse I did not have a chance to tell them that for 2 years in a row I have not taken any cattle to the Pelon Allotment. I wish you would refund the grazing fees or give me proper credit on future bills. There was very little grass both years and the traspass livestock from the west there keep the place cleaned out and don't give it a chance to grow.

57 **There is better grass this year and a check on how much is produced should be made now rather than when it was made in 1975 for the EIS study. The number of AUMs left for cattle after taking 11 for wildlife and putting 404 in suspended non-use leaving only 793 AUMs. How are you going to divide the number of AUMs for each of the four permittees?**

Please let me know what you intend to do so that I can make plans for the future.

Sincerely,

Merced Lucero

Merced Lucero

Response to Comment from Merced Lucero

57. See the response to Comment 54-7.

58

9-10-77

Dear Sir

Mr. Rodney Harris &

Mr. J.W. Whitney

Last Fall (1976) I had a meeting in Cuba with The B.L.M. People For The Valle San Ysidro Allotment. The Purpose of The meeting was To let me Know about The Proposed E.I.S. Donnie Sparks Told me That under This plan I would be allowed To graze 17 Cows on The whole Allotment Instead of The 44 Cows which I am running on The Allotment now. I asked Donnie Sparks why They were Cutting me down To 17 head and he said That They checked The area For Forage and That The area was over grazed. I Told him That They had checked The area after They chained 3 Sections of The west Pasture and he said That was a mistake on Their part and They would evaluate IT again This Fall 1977. I was To be notified when They would evaluate again. To date I have not heard from you. I would like for you To check IT again and revaluate The forage production. The Valle San Ysidro Allotment will Come Closer This year To indicating ITs Potential for forage production Than IT did in 1975 when The first evaluation was done. I would also like To be present when The new evaluation is done. Donnie Sparks promised This To me.

Sincerely

Sisto Sandoval

9-10-77

on The Pelon allotment The B.L.M
should get rid of The Traspass livestock
before Trying To cut us The AUM's
They have in The proposed EIS Plan. I
58 have been on That allotment For
3 years and ever since I have been
There we had livestock Traspassing. I
have Taken a reduction and almost
Taken none use in The past Trying
To Improve The allotment. But we
Can't do it unless we stop The
Traspassing livestock.

The year-round Traspassing livestock is
equivalent To year round use. I move
my Cattle To The Forest during The
growing season but The place does not
get The nessary rest becouse of The
Traspassing livestock. The EIS forage
evaluation was done under This unfair
Condition's and I don't feel The proposed
Cuts are neither fair nor valid under
The Circumstances. I would like To have
a revaluation of The Pelon allotment
and an adjustment made on The
The proposed Cuts. This year when There
has been more rainfall Then in 1976 or
1975 when The original evaluation was
done will Come Closer To being a Truer
Picture of forage production and The
Potential of The land for producing
a renewable resource.

Sincerely
Sisto Sandoval

Response to Comment from Sisto Sandoval

58. The BLM has intensified its efforts to control the unauthorized livestock on public lands. This program will continue as part of overall range management.

59

RADIAN
CORPORATION
DCN #77-310-403-X

15 September 1977

Mr. Rodney Harris
Acting District Manager
Bureau of Land Management
3550 Pan American Freeway, N.E.
P.O. Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Harris:

Thank you for the opportunity to comment on the Rio Puerco Grazing EIS. I spent two years in an environment almost identical to the one discussed in your document. The problems that BLM will encounter in the implementation of the Rio Puerco Project will, I'm sure, be similar to those I've observed in Arizona and Nevada.

Again, thank you for soliciting Radian's comments.

Best regards,

Larry G. Michel

Larry G. Michel
Terrestrial Biologist

LGM:gll

Attachment

COMMENTS
DEIS - RIO PUERCO LIVESTOCK GRAZING MANAGEMENT PROGRAM

Chapter I

59-1	I-19	"No Livestock Grazing" - It appears that wildlife will utilize "significant winter range" that is now in "fair to poor" condition and has "critical erosion problems". One gets the impression that the only AUM's allotted to wildlife are those in areas already depleted by past livestock use.
	I-19	"Unallotted" - Ditto the above comment.

Chapter II

59-2	II-30	"Elk" - 86 percent of the 6,200 acres of critical elk winter range is in "fair to poor" condition. The document cites concentration of elk during winter months as one reason for poor range condition. It should be emphasized that livestock grazing is more likely the cause. If this elk winter range had domestic grazers removed during the winter, wildlife and range conditions would likely both improve.
59-3	II-35	"Antelope" - Big sage brush is cited as the preferred habitat (Sundstrom, 1973) for antelope, yet most sightings in the EIS area have occurred in short-grass vegetation types. Have past grazing practices reduced the preferred habitat? Will cutting/burning of more big sagebrush improve this trend?
59-4	II-43	Table II-16 - This table appears to show that vegetative manipulation of the type proposed decreases small mammal populations.

II-61 The mention and treatment of "Visual Resources" are to be complemented.

59-5 II-69 ORV Use - In an area subject to major erosional disturbances, it would seem that ORV use should be banned.

II-71 "Grazing privileges were established years ago..."; are these the practices that resulted in the poor condition of this range today? If so, perhaps the BLM should show why so called "range improvement" can be effectively carried out now when it hasn't been in the past.

II-82 "Allotment Information" - Ditto above comment.

59-6 II-85 Past livestock grazing has apparently reduced natural fire occurrence important to grasslands while allowing the areal increase of "undesirable" woodlands. Aren't these woodlands important as cover and food to wildlife?

II-94 If 90 percent of BLM's grazing permits are issued to lessee's with Spanish surnames, then Spanish attitudes, expectations and realizations should be characterized as more than just "important."

Chapter III

59-7 III-41 "Decreased Competition" - The use by livestock in the Ignacio Chavez and El Banquito AMP's would not cause competition for forage between livestock and wildlife to be greater than what it currently is. At the outset of the proposed action, won't past use of this forage resulted in an overall habitat quality decline?

59-8 II-42 Fences--the word "could" should be replaced with "will" in the 12th sentence. Wildlife losses to fences are well documented.

Chapter VIII

59-9 VIII-1 Introduction - No allottment has met the criteria for the custodial management alternative..."; the criteria listed indicate that the range condition in all of the present allottments is not acceptable. Were these lands not managed by BLM prior to the 1975 ERI?

Response to Comments from Radian Corporation

59-1. Table I-2, column 10, shows wildlife AUMs reserved on each allotment. Tables III-5 and III-10 show that wildlife AUMs are taken from allotments having varying range conditions and erosion classes. (Also, see the response to comment 48-1.)

59-2. The fair to poor conditions are a combination of past livestock overuse and the concentration of elk during the winter. Proposed management for the critical wildlife areas would improve their condition.

59-3. Past vegetative manipulation practices (brush cutting and chaining) have converted approximately 39,600 acres of the big sagebrush type to a grassland aspect. Approximately 55,400 acres of untreated big sagebrush type remains. The ES area also contains approximately 150,000 acres of the shortgrass habitat type.

The above large-scale conversion of sagebrush to grassland has probably reduced potential antelope habitat in the ES area. However, the proposed burning of 1,465 acres of big sagebrush in the Cebo Allotment would take place in an area that presently lacks the proper interspersion of grasses, forbs and browse vegetative types required for quality antelope habitat. It is believed that conversion in this one particular area of abundant sagebrush would actually improve antelope habitat.

The other 1,600 acres of planned sagebrush conversion are not presently occupied by antelope, and there are no historical records to indicate that they have ever occured in the area.

Response to Comments from Radian Corporation, Continued

59-4. The table does show this and the impact is discussed in Chapter III.

59-5. Refer to the response to comment 46-3.

59-6. The importance of woodlands as cover for food for wildlife is addressed in Chapter III,impact number 39.

59-7. By decreasing the current active AUMs on the El Banquito Allotment by 173 and allocating 1,195 AUMs to wildlife on both allotments, it is anticipated that overall habitat quality will improve under the three and seven pasture rest rotation system.

59-8. The text has been changed to read "would."

59-9. The range condition may have been fair to good, but in many cases the BLM was not satisfied with the present level of management on these (usually small) tracts. In most cases, there were other values conflicting with the present use, such as wildlife.

Generally, these areas met one or more of the criteria for custodial management, but not all.

60

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Division of Ecological Services
Suite C
3530 Pan American Highway, N.E.
Albuquerque, New Mexico 87107

September 21, 1977

Memorandum

To: Acting District Manager, Albuquerque District Office, Bureau of Land Management, Albuquerque, New Mexico

From: Field Supervisor, FWS, Ecological Services, Albuquerque, New Mexico

Subject: Comments on Draft Environmental Statement - The Proposed Rio Puerco Livestock Grazing Management Program

We have reviewed the draft EIS, Proposed Rio Puerco Livestock Grazing Management Program transmitted by your letter of July 28, 1977. We find the draft to be adequate and comprehensive in its treatment of wildlife resources. The Environmental Impacts of the Proposed Action Section is well organized and presents potential impacts on each of the groups of wildlife resources in a concise manner.

The following specific comments relate to the topics as indicated:

60-1 Rest Rotation Grazing, pages 1-18 and 1-19. The text description of the grazing sequence is not consistent with the descriptions of the grazing treatments in the drawings at the top of page 1-18. If the two are laid out end to end and the whole sequence is started in winter (January through March) there is a difference in the winter of the third and fourth years.

60-2 The sequence described at the top of page 1-18 has 15 and 18 month rests. We believe that this discussion should identify the effects of rest periods on browse plants relative to wildlife use. Low pressure on browse plants such as mahogany and bitterbrush may provide insufficient stimulation to produce lateral branches. Plant stagnation could occur resulting in lowering of the quantity of the browse produced. It is then possible that if deer and elk numbers are low, they would not realize an immediate benefit from an abrupt change to a 15 to 18 month rest cycle. We suggest that a phase-in program be considered to overcome this potential problem.

60-3 Page VIII-24, Number 9. The discussion of the impact of removal of grazing on vegetation is unclear and contradictory. It is stated that vegetative production is greater under grazing and that observation shows that long-term decrease in forage results from cessation of grazing. However, the last sentence states that "The increase in forage production: (after elimination of grazing) would be a long-term beneficial impact.

We thank you for the opportunity to comment on this document.

Robert D. Pacific

cc:
Regional Director, FWS, Ecological Services, Albuquerque, New Mexico
Area Manager, Phoenix, U.S. Fish and Wildlife Service, Phoenix, Arizona

61

Cuba, New Mexico
September 12,1977

District Manager
Rio Puerco Resource Area
Bureau of Land Management
Albuquerque, New Mexico

Dear Sir:

As a permittee of the Rio Puerco Resource Area, Padilla Brothers Allotment, I wish to express my views with reference to the recent draft of the Environmental Impact Statement.

61-1 Under the proposed action my allottment will be dcreased by 184 AUM's. Very directly speaking this means cutting my permit by 15 head,in turn meaning, even with a low 80% calf crop, $1,800.00 less gross income for my family per year. Our standard of living has always been a very modest one. How can one justify making matters worse by cutting off a part of the hand that feeds us. A very harsh example, but a realistic one when one considers, as I interpret the statement, that these AUM's are mainly being cut to provide forage for wildlife. It is cause for alarm when, indirectly speaking, one places preferences and values of mammals over humans. If this is exaggerated, I still question the accuracy or validity of data acquired to come up with the figures in the statement to justify such action. Having lived in the community all my life, my experience has been that there is very little competition between wildlife and domestic livestock for the same type of forage, that migration of wildlife varies with conditions of nature beyond our control and basically their habitat is mainly controlled by the laws of nature. If anything, our attempt for control of these factors upsets their very existence.

Just as the examples of co-existence mentioned above could be upset, so is our way of life being upset with the enforcement of action as proposed by the statement. The attitudes, habits,and skills of our rural ranching citizens are simply being ignored and undermined. I was born and raised in the allottment of which I speak. My father was a successful and progressive rancher. Through his efforts through the years he provided for a large family strictly through his ranching operation. Now, besides having to moonlight, I feel being forced out of my own land. Matters worsen when I consider the amount of deeded land I control. Presently I run 75 head of cows, with the reduction it will mean cutting down to 60 head. It appears unrealistic that I own 1600 acres plus 640 acres of state land, totalling 2269 acres (approximately 29% of the total allottment), plus 5660 federal land and being able to only run 60 head. Can I justify keeping my own land on this basis? This figures out that I can only run 4.9 head of cows per section or 1 cow for every 132 acres. I fail to understand the judgement or justification for such decisions. 61-2

Another problem of much concern, and I think I speak for most of the permittees in relating that the prevailing attitude of the rancher here is that of good will and cooperation, when confronted with respect and courtesy. I am sure that if there was more cooperation and mutual respect by the various agencies and us, much could be accomplished in terms of the ideas or objectives as written in the statement. Simply stated, there is a definite need for better public relations between the parties involved.

As a final thought, whatever the final outcome is, I hope you will consider my feelings and expressions in such a manner as to bring forth good constructive results and a better understanding of our situation.

Sincerely yours,
Leandro Padilla
Jose L. Padilla
Permittee
Jose L Padilla

60

Response to Comments from U.S. Fish and Wildlife Service

60-1. These pages have been rechecked, and no inconsistency has been found. In laying out the grazing system, the spring season was used as the starting point (March 1).

60-2. Browse condition transects read throughout the area indicate that, as a general rule, browse plants exhibit low to moderate vigor due to moderate to heavy wildlife and livestock use. Decreasing use on these plants is the only way short of fertilization or irrigation to restore the lost vigor. During the 16-1/2 months' rest from livestock grazing, the plants would still receive sufficient use by existing wildlife populations to stimulate lateral growth. (See the response to comment 49-2.)

60-3. Table VIII-1, Comparison of Impacts for Major Resource Components, Vegetation, illustrates that the present level of AUMs is 69,446; with the proposal it would be 121,788 AUMs; with No Grazing it would be 94,995 AUMs. The No Grazing productivity is less than with the proposal, but more than at present. Therefore, "The increase in forage production above present levels would be an area-wide, long-term beneficial impact," but of lesser magnitude than the proposal.

61

Response to Comments from the Padilla Brothers

61-1. There are times of the year when competition for similar forage is very high between cattle and wildlife. Refer to Figure II-11 on page II-31.

61-2. On 5,660 acres of public land, the permittee will be allowed 60 head (Table I-2). This amounts to 6.8 head per section, or one cow for every 94 acres. Unless private and state lands are offered for exchange of use, no credit will be given for these lands. (See the response to comment 29 for explanation of exchange of use and its relationships to non-public lands.)

62

United States Department of the Interior
BUREAU OF RECLAMATION
WASHINGTON, D.C. 20240

IN REPLY REFER TO: 705

706.

Memorandum

To: D~~irector~~-Bureau of Land Management

From: Commissioner of Reclamation

Subject: Draft Environmental Statement for the Proposed Rio Puerco Livestock Grazing Management Program (DES 77-23)

We have reviewed the subject environmental statement received from Gordon U. Thasher, Acting District Manager, and submit the following comments for your consideration.

The proposed action has long-term beneficial impacts, limited short-term adverse impacts, and a trade-off of some uses of water and land resources.

The long-term reduction of erosion and sediment will reduce stream turbidities, resulting in better water quality and slower sedimentation of reservoirs. The reduction of runoff will result in more infiltration into the soil profile and less runoff into streams and reservoirs. Therefore, there will be indirect affect on other water resources development projects in the basin area.

62-1 It is stated that ground water use will increase from 55 acre-feet annually to 80 acre-feet annually without the project or to 115 acre-feet annually with the project. When the withdrawal is divided among 48 existing wells and 12 additional wells, we believe that it will be difficult to measure the change in ground-water aquifer levels.

62-2 The report contains a discussion on the possibility of saline water intrusion into the ground water because of increased use of ground water. The statement projects this increased salinity to have an impact on birds, etc. If the change of salinity is expected to have an impact, data and evidence should be presented in support of the thesis of impact. Specific comments are as follows:

62-3 Page I-22 -- Table 16 shows there would be 166.7 miles of pipeline installed. While the environmental statement portrays "no impact," perhaps the mitigation section should include a discussion of the rationale that construction for 166.7 miles of pipe will have essentially no adverse impact.

62-4 Page I-26, Wells -- We believe the windmills will be used on high-level non-flowing artesian wells rather than on non-artesian wells. The indicated depth of 600 feet does not appear suitable for current windmill pumping capability.

62-5 Page I-26, Catchments, etc. -- It is not apparent if evaporation has been considered in determining the depths of the water containment basins.

62-6 Page II-111, Table II-46 -- The title of the table does not appear to coincide with information in the table nor with the discussion on page II-110.

62-7 Page III-62, Item 113 versus Page V-4, Item 113 -- Both calculations show a loss of $1,788. The figure shown on page III-62 seems to be based on a 100 percent loss of the annual calf crop.

(Sgd) Clifford I. Barrett

bcc: Acting District Manager, Gordon U. Thasher
Bureau of Land Management, Albuquerque,
New Mexico

(w/o copy of incoming)

Response to Comments from the Bureau of Reclamation

62-1. This is an estimate of groundwater usage annually from the wells on private lands. While we can make estimations of usage, change in groundwater aquifer levels will be difficult to measure.

62-2. Schmidt-Nielsen (1959) experimentally proved that sea birds are able to excrete from specially adapted nasal glands fluids which contain up to 5% salt. Nonmarine adapted birds, however, lack these specialized glands but possess kidneys which excrete only 0.3 percent salt--a rate that is less efficient than man's (Welty, 1962). Given a water supply that contains 3% salt (roughly equivalent to sea water and approximately 3 times as salty as a bird's body fluids), a nonmarine bird would need to excrete 10 liters of urine for every liter of saline water ingested to maintain a proper salt balance. Since this is physically impossible, a nonadapted organism drinking salt water at this concentration would suffer severe dehydration of body tissues and eventual death. If the organism possessed a natural aversion to the consumption of saline water, it would still experience a hardship in that saline contaminated water supplies would be closed to it and the individual would have to seek an alternative source.

62-3. The impacts of installing the 166.7 miles of pipelines are not dicussed in Chapter I. Table I-6 (page I-22) shows a total of 250.05 acres of short-term disturbance due to pipeline installation. The impacts from this disturbance are discussed in Chapter III.

Response to Comments from the Bureau of Reclamation, Continued

62-4. Windmills would be used on high-level nonflowing artesian wells, as well as on nonartesian wells within the pumping capability of the windmill equipment available after drilling and casing are completed. If on a given well, the pumping depth exceeds current windmill pumping capability, an alternate pumping system would be designed.

The 600 foot depth given in the Rio Puerco ES is meant to be used as a judgement tool for amount of cuttings that could come out of a well, and the possible impact - visual or otherwise - that this material might produce. Most of the proposed wells will require drilling depths of less than 400 feet and may have artesian pressure that will reduce the lift required by the pump installed.

62-5. There is no evaporation from the stored water as the pit has a butyl rubber cover over it. The drawing (figure I-5) shows the catchment with the cover cut away (except for the upper corner). The cover and the liner make up a two-piece bag with the edges buried in the soil all the way around. The water flows into this pit between the two sheets of butyl rubber. BLM now has a number of these in operation in another part of the District, and evaporation has not been a problem.

62-6. Table II-46 shows the number of ranches in the year 2000 without the proposal. This table has now been adjusted to also reflect the present situation so a comparison can be made.

62-7. $1,788 is the correct figure. The text has been changed.

63

766-7432

September 15, 1977

Mr. John W. Whitney
Bureau of Land Management
3550 Pan American Freeway NE
P.O. Box 6770
Albuquerque, NM 87107

RE: Rio Puerco Livestock Grazing Management Program

Dear Mr. Whitney:

I have reviewed the subject Draft EIS and herewith provide the following comments for your consideration in preparing the final statement.

First, I would like to compliment the Bureau of Land Management for the completeness and quality of the document. Much research and attention to detail is evident throughout.

Based on hard data and the evidence presented, the effects of the proposed action are overwhelmingly positive. A watershed which produces half the sediment load in the Rio Grande and only 8% of the water (Dortignac, 1957) is clearly in a severely deteriorated condition. Continuation of status quo grazing practices can only result in further degradation.

Accordingly, I support selection and implementation of the proposed action. It appears to offer the optimal mix of long term improvement in forage and watershed conditions, environmental impact, and adverse impact on permittees.

63-1 I am concerned about the impact of fences on wildlife, particularly antelope. Provisions should be made, through wire spacing or elevating the bottom wire to reduce the barrier effect of any new fences.

Public access should be assured, both on new and existing roads, through easements or other mechanisms. However, in no case should said access either with conventional vehicles, motorcycles, or 4-wheel drives dominate resource protection needs. Except in rare cases traffic should be restricted to roads or areas designated for ORV use and signed accordingly.

63-2 There is an additional positive impact resulting from the proposed action which has apparently been overlooked. Reducing erosion and sediment load will reduce the aggradation rate in the Rio Grande below the confluence with the Rio Puerco. This will in turn reduce channel maintenance costs, sedimentation of irrigation works, and silt deposition on Elephant Butte Reservoir. These positive effects should also be sited as benefits of the proposed action.

Sincerely,

Larry T. Caudill

LTC:smt

cc: Senator Pete Domenici
Senator Harrison Schmitt
Representative Manuel Lujan

Response to Comments from Larry T. Caudill

63-1. As stated on page I-31, with few exceptions, new fences would be built to standards for antelope ranges. (Also, see response to comment 3.)

63-2. Impacts 7 and 17 (Chapter 3) discuss the beneficial impacts resulting from the proposal on erosion and water quality. Table III-4 projects reductions in soil loss resulting from the proposal. The Rio Puerco ES area is only a small portion of the total Rio Puerco Watershed area and the magnitude of the positive downstream benefits has not been projected.

The following letters contained comments which had been responded to elsewhere, or had comments which did not deal with the adequacy of the statement.

E. Charles Adams
New Mexico Department of Game and Fish
U.S. Environmental Protection Agency
Andres Maestas, Jr.
Eugene Johnson & Sons
Pablo Aragon, Rosenaldo Aragon, and Mariano B. Lucero
Rudy Gutierrez and Family
State Planning Office/State Clearinghouse
Central New Mexico Audubon Society
State Planning Office
H. Louis Wiese, Jr. and Alice F. Wiese

212 West Silver Spruce
Flagstaff, AZ 86001

August 2, 1977

Mr. Rodney Harris
Acting District Manager
Bureau of Land Management
3550 Pan American Freeway, N.E.
P.O. Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Harris:

Thank you for the copy of the Draft Environmental Statement for the Proposed Rio Puerco Livestock Grazing Management Program. As an anthropologist I will comment only on those sections dealing with cultural resources.

I was impressed by the thoroughness of the consideration of cultural resources from the sampling design stratified according to environmental zones through the diversity of the research potential of these resources to the assessment of impact of the proposed project on the cultural resources. Eastern New Mexico University is to be congratulated on an excellent job.

Sincerely,
E. Charles Adams
E. Charles Adams

GOVERNOR
JERRY APODACA
DIRECTOR AND SECRETARY
TO THE COMMISSION
WILLIAM S. HUEY

DEPARTMENT OF GAME AND FISH
STATE CAPITOL
SANTA FE
87503

STATE GAME COMMISSION
F. URREA, JR., CHAIRMAN
ALBUQUERQUE
ROBERT H. FORREST
CARLSBAD
J. W. JONES
ALBUQUERQUE
ROBERT P. GRIFFIN
SILVER CITY
DR. FRANKLIN B. ZECCA
GALLUP

August 24, 1977

Mr. Robert Harris
Acting District Manager
Bureau of Land Management
P. O. Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Harris:

My staff and I have reviewed the Draft Environmental Statement, The Proposed Rio Puerco Livestock Grazing Management Program, and I wish to make the following comments.

The objectives of the program as listed on Page 1-1 are very commendable. However, the thought occurs to me that a reevaluation of multiple use priorities may be in order in long-range planning for the watershed, once the range conditions have been improved. Livestock grazing, the dominant use, has resulted in the degradation of all other uses, the adverse effects of which have been borne by the public. By bringing the grazing use under control, as proposed in the program, the resultant improvement in vegetative cover would present the opportunities to: decrease erosion and dust storms; decrease sediment deposition into the Rio Grande; improve aesthetic values; improve wildlife habitat; improve water quality; and increase sub-surface water by better infiltration. As human populations increase with the normal advent of civilization and stimulated by development of energy resources with the State, more demands will be placed upon the natural environment by these people. The livestock industry has and will continue to play a major role in contributing to the economy, but if public monies are to be spent primarily for the benefit of the industry, more than fringe benefits to the other uses should also be realized.

I commend you upon the preparation of the wildlife portion of the document and thank you for the opportunity to review and comment upon the Draft Statement.

Sincerely yours,

William S. Huey
Director

cc: William B. Morse

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
FIRST INTERNATIONAL BUILDING
1201 ELM STREET
DALLAS, TEXAS 75270

August 31, 1977

Mr. Rodney Harris
Acting District Manager
Bureau of Land Management
U.S. Department of the Interior
3550 Pan American Freeway, NE
P.O. Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Harris:

We have reviewed the Draft Environmental Impact Statement for the proposed Rio Puerco Livestock grazing management program which is located in an irregularly shaped tract of semiarid land located 40 miles northwest of Albuquerque. The area is bordered on the north by the Jacarilla Apache Indian Reservation; on the east by the Santa Fe National Forest and Jemez Indian Reservation; on the south by the Cibola National Forest and private land; and on the west by public lands, state, Navajo Indian, and private land.

The Bureau of Land Management proposes to initiate an intensive livestock grazing management program through the implementation of Allotment Management Plans including development of necessary range improvements. This proposal involves 61 allotments on approximately 600 square miles of public lands in north-central New Mexico. The EIS aggregates the 61 allotments for the purpose of analyzing the anticipated environmental impacts of intensive livestock grazing management on public lands.

We classify your Draft Statement as LO-1. Specifically, we have no objections to the project as it relates to Environmental Protection Agency's (EPA) legislative mandates. The statement contained sufficient information to evaluate adequately the possible environmental impacts which could result from project implementation. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the attachment. Our procedure is to categorize the EIS on both the environmental consequences of the proposed action and on the adequacy of the impact statement at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft Environmental Impact Statement. Please send us two copies of the Final Environmental Impact Statement at the same time it is sent to the Council on Environmental Quality.

Sincerely yours,

John C. White
Regional Administrator

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

Aug 17-77
[illegible] number 28

Dear Sir,

In regard to the changes that B.L.M. is planning to make, I feel that I already have made mine. In 1960 around there, when they resended my place I was reduced from 50 head to 40 head with a promise that they would be replace, when the posture got better, it got better but my cattel was never replace, that's why I don't want to be [illegible], I feel that that is being unfair to me, I want to keep it as it is.

And I don't want to be join with other permitte, because it is going to be too hard. Our cows are already use to this place, and two people wasn't work together, some will go and some won't. so one or two people will be stuck with the worke I want to leave it as it is I don't want someone to have to tell me what to do and what not to do,

Sincerely Yours,

September 12, 1977

Dear Sirs:

I am giving a few objation I have of the Impact Statement you sent out.

First your rotian plan does not work. We have to dry of weather for long periods to concentrate the cattle. The cattle trail and tramp more grass than the eat. We do not have long enough growing seasons for this type of grazing.

In the past the BLM has been a good Agency. The BLM and the ranchers have been able to sit down and discuss and decide what practies was good and what was wrong.

If this Impact Statement goes into affect, we are afraid all of this will be lost. People from another region, district or aera cannot tell another rancher what is wrong or how to help it.

In the past there have been many people from BLM working with us. Not just a few or maybe one telling us what, when and how things should be done.

Sincerely yours,
Eugene E. Johnson
Eugene Johnson & Sons
Clara May Johnson
Carl E. Johnson
Timothy L. Johnson

Cuba, New Mexico
Sept. 14, 1977

Dept. of the Interior
Bureau of Land Management
Albuquerque, New Mexico

Dear Sirs:

We, Mr Pablo & Rosenaldo Aragon & Mariano Lucero, permetees of the Cebo Community allotment, do not agree to the proposal that was made at the Cuba meeting on September 14, 1977, to combine with other permetees.

Because the three of us coporate real well and we share the work equaly. Too, we move our cattle in June, to the summer posture in the Forest Service, and we would not like anyone else in our posture during the summer. Then it would be an inconvenience during the time we are branding and preparing to move our cattle.

Very Respectfully Yours
Pablo Aragon
Rosenaldo Aragon
Mariano B. Lucero

P. O. Box 12
La Jara, New Mexico
Sept. 14, 1977

Mr. Rodney Harris
Acting Manager
Bureau of Land Management
3550 Pan-American Hwy, N.E.
AlBuquerque, New Mexico

Dear Mr. Harris:

Please allow me to include and make part of the record two oversights that I believe will further strengthen my request not to combine the South Divide Allotment with mine, the North Divide Allotment. The aerial spraying of sagebrush should have been included in my letter of July 15, 1976 when I listed expenditures for allotment improvements, -- the other is of recent development.

1. Three-fourths of Sec. 1, and one-fourth of Sec. 6, T. 21, R 4W (private property) were aerial sprayed to kill sagebrush in the spring of 1973 at an expenditure of $1696. The area still lends itself to research on sagebrush eradication, and forage response to fertilization.

2. An agreement with New Mexico State University has been made for them to do research on solar energy on de-icing water for livestock use. This research is to be done in the winter of 1977-78.

Sincerely,
Rudy Gutierrez
Rudy Gutierrez

cc:
Senator Harrison Schmidt (
Senator Peter Domineci (Addendum to information submitted
Congressman Manuel Lujan (regarding Rio Puerco EIS.
Congressman Harold Rennels (

STATE OF NEW MEXICO

STATE PLANNING OFFICE

Leila Andrews
STATE PLANNING OFFICER

Jerry Apodaca
GOVERNOR

State Clearinghouse
TEL. 505-827-2073
GREER BLDG.
505 DON GASPAR
SANTA FE, NEW MEXICO 87503

TO: Department of Interior
P.O. Box 6770
Albuquerque, New Mexico 87107

Attn. John W. Whitney

DATE: August 3, 1977

FROM: **The State Planning Office (State Clearinghouse)**

STATE APPLICATION IDENTIFIER (SAI): 8 08 11 001

SUBJECT: RECEIPT OF APPLICATION NOTIFICATION

Project Title: Rio Puerco Livestock Grazing Management Program

Federal Funding Agency Dept. Interior

Clearinghouse Staff Contact: Jon Samuelson

The State Application Identifier (SAI) has been assigned to the project. All future correspondence on this project must include this identification number.

The Notice of Intent Form MIS-1 for the above project was received by the State Planning Office (State Clearinghouse) on 8-3 (Date).

The review of this project has begun at the state level. You may expect notification of completion of the initial review by 9-3 (Date).

Your application package should also be submitted to the clearinghouse(s) checked (x):

01☐STATE CLEARINGHOUSE
10☐SAN JUAN REG. COMM.
11☐MCKINLEY AREA COG
20☐NCNMEDD
30☐MRGCOG
40☐EPCOG
50☐SWNMCOG
51☐SRGCOG
60☐SENMEDD

See other side for names and addresses of the clearinghouses.

MIS-2
REV. MAY, 1977

NEW MEXICO PLANNING DISTRICTS AND CLEARINGHOUSE DIRECTORY

CODE NO.	CLEARINGHOUSE NAMES & ADDRESSES	COUNTIES	DISTRICT
01	State Planning Office Greer Building 505 Don Gaspar Santa Fe, New Mexico 87503 Telephone No.: (505) 827-2073	Statewide	Statewide
10	San Juan Regional Committee San Juan County Courthouse Aztec, New Mexico 87410	San Juan	1
11	McKinley Area COG 300 West Hill, Suite 2 Gallup, New Mexico 87301 Telephone No.: (505) 722-4327	McKinley	1
20	North Central New Mexico Economic Development District Post Office Box 4248 Santa Fe, New Mexico 87501 Telephone No.: (505) 827-2014	Colfax Los Alamos Mora Rio Arriba San Miguel Santa Fe	2
30	Middle Rio Grande Council of Governments 505 Marquette, NW - Suite 1320 Albuquerque, New Mexico 87101 Telephone No.: (505) 243-2819	Bernalillo Sandoval Torrance Valencia	3
40	Eastern Plains Council of Governments Curry County Courthouse Clovis, New Mexico 88101 Telephone No.: (505) 762-7714	Curry De Baca Guadalupe Harding Quay Roosevelt Union	4
50	Southwest New Mexico Council of Governments Post Office Box 2157 Silver City, New Mexico 88053 Telephone No.: (505) 388-1974	Catron Grant Hidalgo Luna	5
60	Southeastern New Mexico Economic Development District Post Office Box 6639 RIAC Roswell, New Mexico 88201 Telephone No.: (505) 374-5425	Chaves Eddy Lea Lincoln Otero	6
70	Southern Rio Grande Council of Governments 575 S. Alameda City-County Office Building Las Cruces, New Mexico 88001 Telephone No.: (505) 523-7474	Socorro Sierra Dona Ana	7

Central New Mexico Audubon Society
POST OFFICE BOX 30002 — ALBUQUERQUE, NEW MEXICO 87110

Sept. 14, 1977

United States Department of the Interior
Bureau of Land Manggement
3550 Pan American Freeway, N.E.
P.O. Box 6770
Albuquerque, New Mexico 87107

Dear Sir;

I have recently completed reading the draft environmental statement for the Proposed Rio Puerco Livestock Grazing Management Program and found it a very informative piece of literature. If you execute your management plans as you have outlined in the draft proposal your end products should be very productive. I agree with the increased units of land, livestock, water, and wildlife you hope to gain by rotational and seasonal grazing and watershed practices. In an semi-arid desert region such as the Rio Puerco rotational and seasonal grazing methods are usually the most productive and beneficial to livestock and wildlife.

My main concern is you reach or come close to your figures and proposed benefits for the wildlife in the area. Where as they have axcess to water tanks and the livestock shouldn't be too competitive with the big mammals in the area if the livestock is kept away from the outer edge of some of the land units where it is too rocky for cattle.

Thus allowing both livestock and wildlife to graze freely.

Good luck with the finally proposal and accomplishing your goals for the Rio Puerco area.

Sincerely,
Consetta Helmick
Consetta Helmick
2106 College #28
Las Cruces, N.M. 88001

STATE OF NEW MEXICO

STATE PLANNING OFFICE

GREER BUILDING
505 DON GASPAR AVE
SANTA FE 87503
(505) 827-2073

LEILA ANDREWS
STATE PLANNING OFFICER

JERRY APODACA
GOVERNOR

September 19, 1977

Mr. John Whitney
Bureau of Land Management
Post Office Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Whitney:

We have reviewed the Draft Environmental Statement for the Proposed Rio Puerco Livestock Grazing Management Program. The State Historic Preservation Officer has also reviewed the statement, and his comments are attached.

We have no comment on the environmental statement. Thank you for the opportunity to review.

Sincerely,

Kate Wickes

Kate Wickes
Resources Planning

KW:anne

Attachment

September 6, 1977

Mr. Gordon A. Frashier
Acting District Manager
Bureau of Land Management
Post Office Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Frashier:

I have received the Draft Environmental Statement for the Proposed Rio Puerco Livestock Grazing Management Program and the comments of the Advisory Council on Historic Preservation (August 24, 1977). The Council requests that the Historic Preservation Officer be contacted in the early stages of specific project planning, and that the Advisory Council be afforded an opportunity to comment on individual Environmental Assessment Records. I think this is appropriate, and will review and comment on the EARs as we customarily do. This accords with your response to my comments as summarized in the Statement (IX-3).

The Statement does not appear to respond to my recommendation that areawide Management Framework Plans specifically addressed to cultural resource management be written and formalized in the usual way. The question of effect on cultural properties can doubtless be adequately dealt with through reviews of the EARs. The purpose of areawide management plans, however, lies in the ability they could be expected to give us to choose alternatives for development and deal with relative significance over large tracts. This broader planning base would be a basis of comparison which would help us avoid the repetition (for example, of data collection) which always occurs when one site within the area of a project undertaking is dealt with as needed, and mitigation and protection efforts continue in that piecemeal fashion. I take this opportunity once again to commend the recommendation to your attention.

Sincerely,

Thomas W. Merlan
State Historic
Preservation Officer

TWM:vk

August 28, 1977
P.O. Box 147
Cuba, New Mexico 87013

Hon. Senator Harrison Schmitt:

We feel that you as Senator should know how the majority of the ranchers think regarding the Draft Environmental Statement for the Proposed Rio Puerco Livestock Grazing Management Program.

Most of us feel it is nothing but a "Boon-doggle" and demeaning to the rancher. It may well put us out of business.

We who have been running our livestock know the range conditions, the cattle and how the weather affects us. We have lived and worked with our cattle for many years. Most of us do not abuse the use of our land or our leased land. It is our livelihood.

No one has the right to come in and tell us when to move our cattle from one pasture to another. No studies they have made can tell a rancher that he has to move his cattle to a pasture that he knows is not good. One rancher was made to move his cows to a pasture where there were pine trees which the cows ate the needles from and aborted fifty or more calves. Did you know this could happen? I don't imagine many people know this unless they have run cows for years under these conditions..

We leasr this land and pay exorbitant prices for its use. Now we have to have our ranches split up into pastures and handled by a group of men that could na understand in ten years what it has taken us years of experience, hard work, and tears to know.

We have learned the hard way and resent having to be treated in this manner. As I have stated before, it is very demeaning to us.

Respectfully,

H. Louis Wiese, Jr.

H. Louis Wiese Jr.
Alice F. Wiese

HARRISON SCHMITT
NEW MEXICO

United States Senate
WASHINGTON, D.C. 20510

September 9, 1977

Mr. Rodney Harris
Acting District Manager
Department of the Interior
Bureau of Land Management
Post Office Box 6770
Albuquerque, New Mexico 87107

Dear Mr. Harris:

My office has been contacted by Mr. H. Louis Wiese, Jr. of Cuba, New Mexico, regarding his dissatisfaction with the Proposed Rio Puerco Livestock Grazing Management Program.

I have enclosed a copy of Mr. Wiese's letter for your consideration and would appreciate your comments, in writing, on the various points he raises.

Thank you for your assistance.

Sincerely,

Jack

Harrison Schmitt

HS:wc

Enclosure

4112.15
x1792 (912)

STATE OFFICE
P. O. Box 1449
Santa Fe, New Mexico 87501

Sept. 23, 1977

Senator Harrison "Jack" Schmitt
United States Senator
Dirkson Senate Office Building
Washington, D. C. 20510

Dear Senator Schmitt:

Your inquiry on behalf of Mr. and Mrs. H. Louis Wiese of Cuba, New Mexico addressed to our Albuquerque District Office, has been forwarded here for reply.

Mr. and Mrs. Wiese are concerned that the proposed Rio Puerco Livestock Grazing Management Program, which was recently published as a draft environmental statement, will put them out of business. Mr. Wiese, and his father before him, have grazed livestock on the Forty-four Grazing Allotment south of Cuba for many years. The allotment contains 2,484 acres of public land and 2,201 acres of private land owned by Mr. Wiese. The land is intermingled. Currently the allotment has an annual grazing license for 75 cattle and three horses. This number of animals has been consistent for many years. The allotment contains four pastures. Two of the smaller pastures have a combined carrying capacity equal to each of the other two.

On June 11, 1976, we met with Mr. Wiese to discuss an allotment management plan proposed for his particular unit. The allotment management plan is the method the Bureau has selected to meet the objectives outlined in the Federal Court ordered environmental statement process (Natural Resources Defense Council, et. al., versus Morton, December 30, 1974). During our session with Mr. Wiese, changes were made in the proposed allotment management plan to reflect Mr. Wiese's experience. The allotment management plan proposal would establish a three pasture rest-rotation grazing system. A slight increase of four additional cows would be allowed. An area within the allotment that contains pine trees would not be grazed during the dangerous period of the year.

In the past ten years some 1,300 allotment management plans have been developed on public land grazing allotments throughout the west. These plans are based on sound principles of range management backed by much research from government agencies and western universities.

Most ranchers have excellent knowledge of their particular grazing areas. We use this knowledge in developing a plan for each unit. As in Mr. Wiese's case, we have met with him and believe we have worked our a plan which will improve the public lands, continue to support his livestock grazing and meet all of the objectives of multiple-use public land management. The Bureau has the responsibility under the 1934 Taylor Grazing Act and the 1976 Federal Land Management & Policy Act to manage the public lands in the best interests of all users.

The incident, Mr. Wiese mentioned, about the death of livestock from eating pine needles is known to us. The matter was investigated and the rancher contacted. According to his account, he did lose some calves; however, he felt that it was a combination of circumstances that caused the deaths. He did not blame the Bureau for the incident.

The matter of grazing fees has been controversial for many years. The grazing fee formula presently in use was developed in 1966 at a cost of $1,000,000 by an interagency group consisting of the Bureau, the Forest Service, the Bureau of the Budget and the Economic Research Service. This formula bases the federal grazing fee on the private land grazing fees in the western states. Currently the BLM grazing fee is $1.51 per animal, per month, or $18.12 to graze one cow each year. Private land grazing leases are now running around $5.20 per month or $62.40 for one cow per year. Federal lands leased by the Bureau through open competitive bidding, such as the McGregor Range, are now bringing $5.41 per animal unit month. It would appear that Mr. Wiese's claim of "exorbitant fees" cannot be proven when compared with other grazing land fees.

As you are aware, there is currently in progress a new grazing fee study. This is a directive in Section 401(a) of the Federal Land Management & Policy Act of 1976. This study will be given to Congress for action by October 21, 1977.

I hope that we have answered Mr. Wiese's questions.

Sincerely yours,

/s/ Arthur W. Zimmerman

State Director

The following letters were received too late for response.

U.S. Fish and Wildlife Service

Cibola National Forest

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103
October 12, 1977

IN REPLY REFER TO:
(OBS)

Memorandum

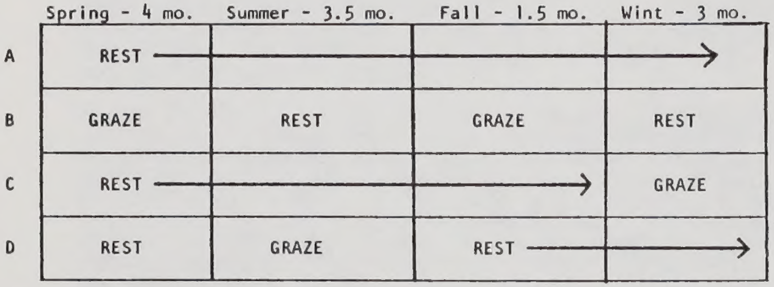
To: District Manager, Bureau of Land Management,
Albuquerque, New Mexico

Acting
From: Regional Director

Subject: Rio Puerco Grazing EIS Comments

We have previously submitted comments on the Draft Rio Puerco grazing EIS which were consolidated with those from our Albuquerque Field Office. We realize the date for comments is past, but would like to offer additional suggestions for your consideration.

Upon further review we have some reservations concerning the proposed rest-rotation grazing formula on page 1-18, Figure 1.1. The system as proposed can be displayed as follows:



	Spring - 4 mo.	Summer - 3.5 mo.	Fall - 1.5 mo.	Wint - 3 mo.
A	REST ⟶	⟶	⟶	⟶
B	GRAZE	REST	GRAZE	REST
C	REST ⟶	⟶	⟶	GRAZE
D	REST	GRAZE	REST ⟶	⟶

We would like to raise the following points:

1. The draft EIS states that the long rest period will be 15 months. In fact it will be 16.5 months resulting from the Treatment D to Treatment A sequence. This will combine with another long rest of 12 months from Treatments B and C.

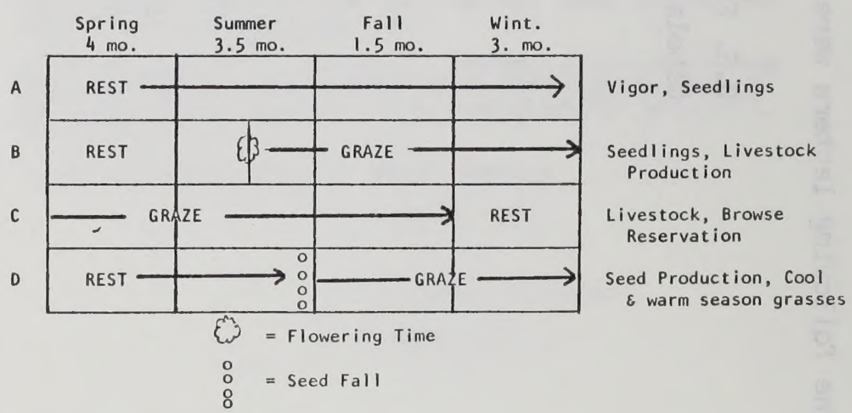
2. The rationale for the spring grazing in Treatment B is that forage produced the previous year will be used. We believe that this will not be the case. The previous year's forage will be cured, dry, and low in nutritive value. Experience shows that the forage utilized in the spring will be new growth.

3. We concur that the fall and winter grazing should result in planting of seeds; however, we wish to point out that neither of these treatments is followed by the two growing season's rest usually recommended for seedling establishment and survival.

4. In treatment D, the rationale for the fall rest is to allow seedlings planted by summer grazing to become established. We do not believe this will occur due to the fact that the seeds will not likely germinate until the following spring or summer.

5. We believe that the fall rest in Treatment C is unnecessary for the stated purposes of vigor and seed production. By this time the plants will have produced seeds and stored food. Fall grazing for seed scattering may be more valuable than the proposed rest.

6. We are somewhat concerned that the formula contains no treatment providing for livestock production, and feel that ranchers might balk at participating in a grazing scheme without this provision. A member of our staff proposes the following formula for your consideration.



	Spring 4 mo.	Summer 3.5 mo.	Fall 1.5 mo.	Wint. 3. mo.	
A	REST ⟶	⟶	⟶	⟶	Vigor, Seedlings
B	REST	✿ ⟶	GRAZE ⟶	⟶	Seedlings, Livestock Production
C	⟶ GRAZE	⟶	⟶	REST	Livestock, Browse Reservation
D	REST ⟶	⟶ o o o o	⟶ GRAZE	⟶	Seed Production, Cool & warm season grasses

✿ = Flowering Time

o o o o = Seed Fall

Note that under the system proposed in the draft EIS, grazing will occur in a total of only 12 months out of a four year cycle. In the formula proposed above, grazing could occur in about 20 months, livestock production is considered, and the needs of the plants and wildlife forage are met. We feel that such a scheme would be more acceptable to ranchers upon whom you depend for cooperation, and it would satisfy our concerns for wildlife as well.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Cibola National Forest
10308 Candelaria NE.
Albuquerque, New Mexico 87112

8430
October 12, 1977

State Director, New Mexico Office
Bureau of Land Management
3550 Pan American Freeway, NE.
P.O. Box 6770
Albuquerque, New Mexico 87107

Dear Sir:

Thank you for providing us with an opportunity to review the draft environmental statement titled "The Proposed Rio Puerco Livestock Grazing Management Program." We would like to make the following comments concerning the draft environmental statement.

There are two situations where BLM lands and Cibola National Forest lands are contiguous and we would like to express our observations about the areas. The first area is in the lower breaks of Guadalupe Canyon and Rio Chico. This area is very prime winter habitat for elk and deer and we feel it is important that the area be recognized for this concentration of wildlife use during the winter months in your planning. The second location is the lands that lie adjacent to an area we recently inventoried as roadless. Sections of National Forest land that adjoin BLM lands are Section 14, 15, 16, 23, 26 and 35, T15N, R4W. Since these lands have been identified as roadless, we feel that your roadless evaluation should consider the area as an ecosystem.

Sincerely,

for S P Gordon
KEITH T. PFEFFERLE
Forest Supervisor

Appendices

APPENDIX I-1

METHODOLOGY USED IN THE DETERMINATION OF FORAGE PRODUCTION FOR GRAZING ANIMALS (MEASURED IN AUMs) FOR THE RIO PUERCO ES AREA

The following is a summary of the procedures and methods used in the preparation of grazing capacity in the Rio Puerco ES Area. First, the method of determining existing capacities will be discussed, followed by the procedure for allocating the forage, and finally, a brief description of the method for determining potential forage production will be presented.

Determination of Existing Forage Capacities (1975)

In 1975, BLM employees completed a resource inventory of the Rio Puerco ES Area. The inventory consisted of two major components: the actual collection of data, and the analysis and compilation of that data. However, immediately prior to the actual data gathering, the Resource Inventory team examined BLM aerial photographs of the ES Area to determine range sub-type distinctions. Range sub-types are relatively homogenous classifications of a portion or sometimes all of a vegetative sub-type. (Aerial photographs can also provide some general soils type information, but are used primarily for range and vegetative sub-type information.) In addition to aerial photographs, the Inventory team consulted maps defining vegetative sub-type boundaries within the ES Area. This information was supplied by the Technical Application Center (TAC) of the University of New Mexico and NASA as part of a contract agreement. Vegetative sub-type boundaries were distinguished for ponderosa pine, big sagebrush, four-wing saltbush, greasewood, shortgrass, broom snakeweed, pinyon-juniper, steep and rocky, and barren. With general boundaries and distinctive sub-types established, the Inventory was begun.

The next step was to collect data. This process was based upon the Step-Point method, which involves pacing off 100 points along a predetermined transect line, with each point representing one percent (100 points = 100 percent). A range conservationist thoroughly checked the area to be inventoried and selected a section that appeared to be most representative of that area. A transect line was established and data was collected. Transects were done for each vegetative sub-type within each pasture of the 96 existing allotments in the Rio Puerco ES Area. A total of 735 pace transects were completed.

A large variety of data was gathered during the BLM Resource Inventory. Data collected at each point location (each step) consisted of the type of ground cover (litter, bare ground, small or large rock); vegetation by species (composition); usable forage vegetation by species; and vegetative cover by species.

Further observations made within the transect areas included information on exposure, elevation, moisture source of the site, class of livestock, suitability/unsuitability of the range for livestock, and percent utilization of the major perennial forage plants. A sample of all unknown grasses, forbs and shrubs was also collected. In addition, a soil pit was dug within each transect site to provide information such as the effective root depth of the soil and the soil texture of effective root depths (to four inches and below).

Once the actual data was collected, the Proper Use Factor (PUF) of each usable forage plant had to be determined before the 1975 Inventory data could be compiled. A PUF represents the average weight percentage of a particular plant species, in relation to all other species, that can be safely grazed without restricting forage capacity production. Certain forage species are preferred above others; therefore, PUFs of each species vary according to grazing animals' preference, and range in value from 0 to 55. Form 4412-1 shows PUFs for species found on a transect site within one allotment.

The next step in calculating the existing forage capacity was to determine Forage Acre Requirements (FARs) for the Rio Puerco ES Area. A FAR is that part of a forage acre necessary to support one animal unit for one month. Actual use data (1958 - 1963) on an actual use pasture containing 591 acres located in a central part of the Rio Puerco ES Area was analyzed (see Visual A). During this six year period when good actual use records were documented, average use was 64.83 AUMs per year. To determine the number of forage acres in the 591-acre, actual use pasture, transect data was collected. A forage acre is the number of acres in a specific area (such as a pasture or an allotment) that is completely covered by forage. It is calculated by multiplying the total surface acres in the area by the Forage Acre Factor.

The data was further analyzed as three separate six-year periods of forage production, rather than one eighteen-year period. Data from the first six-year period was interpreted as being similar to an area with yearlong grazing use. The second six-year period was analgous to areas that had been under management and grazed seasonally, and data from the third period reflected grazing management under an intensive management system that had been in effect for 15 years. Pertinent information from the San Luis Study is summarized below:

Period	Forage Acres	AUMs	Acres/AUM	FAR
1952-57	22.69	40.52	14.58	0.56
1958-63	22.69	64.83	9.12	0.35
1964-69	22.69	133.47	4.43	0.17

It was determined that 591 acres were equal to 22.69 forage acres in the San Luis actual use pasture. The FARs were then calculated according to the method of R. R. Humphrey: $\frac{A}{B} = C$, A = number of forage acres (22.69); B = cow months of use (64.83); and C = Forage Acre Requirements (.35). Once the Proper Use Factor (PUF) and Forage Acre Requirements (FAR) were determined, the information was used in conjunction with the data from the 735 transects to calculate present grazing capacity for the Rio Puerco ES Area (calculated in AUMs).

The following calculations were completed on each transect site as shown on Form 4412-1:

(1) PUF x percent composition = average PUF (This step was done for each vegetative species recorded. If more than one species was recorded, the average PUF for each was added together at this point.)

(2) Total average PUFs (36.9) x percent ground cover of usable forage (.30) = Forage Acre Factor (.11)

(3) Forage Acre Factor (.11) x percent of area suitable for livestock (100%) = Net Forage Acre Factor (.11)

(4) Forage Acre Requirement (.56)* ÷ Net Forage Acre Factor (.11) = Acres/AUM (5.09)

(5) Transect Area Acreage (898 acres) ÷ Acres/AUM (5.09) = Total AUMs for the Transect Area (176 AUMs)

The total AUMs for each transect area within each pasture of the allotment were added together to determine the total AUMs for the allotment.

Determination of Forage Allocation (for Wildlife and Livestock)

After the total AUMs for grazing animals were determined, wildlife needs were calculated by the District Wildlife Biologist, incorporating information from the District Habitat Management Plans (HMPs) and recommendations from New Mexico Game and Fish. The AUMs reserved for wildlife were then subtracted from the total AUMs available for grazing animals in order to determine the AUMs to be allocated for livestock.

Determination of Potential Forage Production (Year 2000)

Potential forage production was determined by using several information sources. Data from existing studies related to vegetative potential (San Luis Watershed Study), climatic variances (U.S. Weather Bureau and Rocky Mountain Forest and Range Experiment Station Study 108, 1968) and soil association data (Cabezon and Soil Survey) were utilized.

Vegetative potential value of percent increases range from 135 percent sagebrush on an existing AMP, to 233 percent four-wing saltbush on a non-AMP site.

* This figure used because area had yearlong grazing use.

Form 4412–1
(November 1970)

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORAGE SURVEY TYPE WRITEUP
(OCULAR RECONNAISSANCE METHOD)

Writeup No 01-50-13

Date 8-20-75

Aerial Photo No.

Examiner	KIND OF GRAZING ANIMAL *	SEASON OF USE	SECTIONS	TWP.	RGE.	MER.
Vlahos and Rogers						
Type 01	Cattle	YL				
Ac/AUM						

	SPECIES	TOTAL ALLOWABLE PUF	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X __ PUF
GRASSES	Bogr		30	50	15.0						
	Muto		17	10	1.7						
	Arlo		10	15	1.5						
	Hija		20	40	8.0						
	Agsm		3	40	1.2						
	SUBTOTAL										
FORBS											
	SUBTOTAL										
SHRUBS	Eula		10	45	4.5						
	Argr		10	50	5.0						
	SUBTOTAL										
	TOTALS		100		36.9						

Av C PUF 36.9 × Av Den .30 = FAF .11 × 100 % Util = Net FAF .11 ; FAR .56 ** ÷ Net FAF .11 = 5.09 Ac/AUM

Acres of Transect - 898
Ac/AUM - 5.09 = 176 AUMs within Transect Area

---

*Livestock and major game species. *(Other game species making inappreciable use are:* ——

** This figure was used because the area had yearlong grazing use.

Form 4412-1 (continued)

UTILIZATION DEDUCTIONS IN PERCENT

USE CRITERIA	CATTLE	SHEEP	DEER		
Slope					
Rocks or Stones					
Timber					
Lack of Water					
Unstable Soils					
Erosion					
Rodents					
Insects					
Other *(specify):*					
TOTAL DEDUCTION	0				
PERCENT UTILIZABLE	100				

☆ GPO 1975-679-531-238/8

Non-AMP areas with less than ten inches of precipitation on pinyon-juniper and sagebrush vegetative sub-types were reduced 30 percent because of higher evaporation rates (due to lack of surface litter, high water requirements, etc., of the two species).

Of eight soils studied in the Rio Puerco watershed by the Rocky Mountain Forest and Range and Experiment Station, five are located within the ES Area. These five soils include approximately 477,000 of the 511,000 acres. Their conclusion was that moisture was the limiting factor and that no soil characteristic would allow a measurable difference in potential productivity to be shown. While no significant differences were identified in the study, relative productivity factors were assigned to the soils to indicate variances influenced by basic soil characteristics. As found in the data, they are as follows:

Associations	Percent Decrease
Christianburg-Navajo	1
Litle-Las Lucas	0
Penistaja-Berent-Sandstone	2
Basalt Outcrop-Cabezon-Torreon	3
Billings-Persayo	5
Travessilla-Persayo	4

The following calculations illustrate the method that was used to determine potential production:

(1) Vegetative potential (e.g. 152%) +

Precipitation Factor (e.g. -30%) +

Soils Productivity Factor (e.g. -5%) =

Total Weighted Vegetative Potential Factor (e.g. 117%)

(2) Existing Production (e.g. 176 AUMs) x

Total Weighted Vegetative Potential Factor (e.g. 117%) =

Potential Forage Production (e.g. 206 AUMs)

Appendix I-2

SAN LUIS WATERSHED STUDY
WATERSHED NO. 2

Average Ground Cover Index and Production[1]
For Major Grass Species and Total Grasses

Year	Galleta Cover	Galleta lbs/acre	Alkali Sacaton Cover	Alkali Sacaton lbs/acre	Blue Grama Cover	Blue Grama lbs/acre	Perennial Grass Cover	Perennial Grass lbs/acre*
Yearlong Grazing								
1952	2.13	*	1.51	*	1.26	*	4.90**	195.0
1953		*		*		*		293.0
1954		*		*		*		103.0
1955	2.21	105.2	1.28	42.0	.61	17.2	4.10**	164.4
1956		45.4		19.5		4.6		73.3
1957		53.0		36.0		8.0		103.0
Ave.		67.9		32.5		9.9		156.0
Summer Deferred Grazing								
1958	1.42	110.2	1.06	87.7	.48	33.3	3.08*	237.8
1959		117.5		55.3		14.8		195.4
1960		85.8		51.7		13.2		167.4
1961	3.49	137.0	3.45	72.0	.96	20.0	8.43	250.0
1962		193.0		88.0		23.0		332.0
1963	6.14	118.0	4.38	123.2	1.14	23.6	11.66	282.9
Ave.		126.9		79.7		21.3		244.3

---

[1] Occurrence of a basal portion of a plant within 3/4" loops placed at 1 ft. intervals along a 100 ft. transect. Litter, bare soil, or rock must occupy half or more of the loop area to be counted (from Parker).

*Total grasses measured.

**Three Major Species measured.

Appendix I-2 (continued)

Year	Galleta Cover	Galleta lbs/acre	Alkali Sacaton Cover	Alkali Sacaton lbs/acre	Blue Grama Cover	Blue Grama lbs/acre	Perennial Grass Cover	Perennial Grass lbs/acre*
1964	3.99	158.7	4.21	289.3	1.10	27.8	10.03	497.7
1965		115.0		255.3		25.4		429.4
1966		156.4		295.1		44.4		525.0
1967		164.0		276.4		41.4		522.3
1968		180.0		292.6		51.8		561.8
1969	3.47	230.0	3.64	338.0	1.33	83.0	9.51	721.0
Ave.		167.4		291.1		45.6		542.0
1970		222.0		299.0		67.0		653.0
1971	3.01	155.0	4.08	250.0	1.60	63.0	9.69	509.0
Ave.		188.5		274.0		65.0		581.0

*Total grasses measured

Source: San Luis Watershed Study Data, 1972. Rocky Mountain Forest Experimental Station, Fort Collins, Colorado. U.S. Department of Agriculture, Forest Service. Unpublished Report. Albuquerque District Office.

Appendix I-2 (continued)

Ground Cover Index of Principal Ground Cover[1]

Percent

Year	Galleta	Alkali Sacaton	Blue Grama	Total Grasses	Total Vegetation
Continuous Yearlong Grazing					
1952	2.13	1.51	1.26	4.90	21.71
1955	2.21	1.28	.61	4.10	-
1958	1.42	1.06	.48	2.96	10.72
Summer Deferred Grazing					
1961	3.49	3.45	.96	7.90	13.13
1963***	8.43	6.41	1.43	16.27	24.95
1963	6.14	4.38	1.14	11.66	16.69
1964	3.99	4.21	1.10	9.30	11.49
1969	3.47	3.64	1.33	8.44	11.21
1971	3.01	4.08	1.60	8.69	10.38

---

[1] Occurrence of a basal portion of a plant, litter, bare soil or rock within 3/4" loops placed at 1 ft. intervals along a 100 ft. transect. Litter, bare soil, or rock must occupy half or more of the loop area to be counted (from Parker).

***Deep soil ripped in 1963 - Before and After.

Summarized from Annual Reports and Publications (5) (6)

Year	Precipitation (inches) Annual 11/1-10/31	Growing Season 5/1-10/31	Production Perennial Grass Airdry lbs/acre	Ground Cover Perennial Grasses	Index[1] Total Vegetation
Yearlong Grazing Period					
1952	Not Available		195	4.90	21.71
1953			293	-	-
1954	13.10	9.30	103	-	-
1955	6.86	6.35	168.4	4.10	-
1956	6.21	2.20	73.3	-	-
1957	12.05	8.16	103.0	-	-
6 Year Average Production = 156.0 Under Continuous Grazing.					
Summer Deferred Grazing Period					
1958	12.72	6.44	237.8	2.96	10.72
1959	10.72	6.84	195.4	-	-
1960	11.48	5.42	167.4	-	-
1961	10.60	9.59	250.0	7.90	13.13
1962	6.25	2.32	332.0	-	-
1963	9.42	3.94	282.9	11.66	16.69***
6 Year Average Production = 244.3 = 57% Increase.					

---

[1] Occurrence of a basal portion of a plant, litter, bare soil or rock within 3/4" loops placed at 1 ft. intervals along a 100 ft. transect. Litter, bare soil or rock must occupy half or more of the loop area to be counted (from Parker).

***After deep soil ripping.

Appendix I-2 (continued)

Year	Precipitation (inches) Annual 11/1-10/31	Precipitation (inches) Growing Season 5/1-10/31	Production Perennial Grass Airdry lbs/acre	Ground Cover Perennial Grasses	Index[1] Total Vegetation
1964	9.00	6.57	497.7	9.30	11.49
1965	12.81	9.02	429.4	-	-
1966	8.62	6.05	525.0	-	-
1967	10.33	9.08	522.3	-	-
1968	10.11	5.60	561.8	-	-
1969	14.84	11.57	721.0	8.44	11.21
6 Year Average Production = 542. = 247% Increase.					
1970	8.50	5.92	653.0	-	-
1971	10.03	7.14	509.0	8.69	10.38
18 Yr.Avg.	10.20	6.75			

Last 8 Years, Average Production = 552.4 = 254% Increase.

---

[1] Occurrence of a basal portion of a plant, litter, bare soil or rock within 3/4" loops placed at 1 ft. intervals along a 100 ft. transect. Litter, bare soil or rock must occupy half or more of the loop area to be counted (from Parker).

Source: San Luis Watershed Study Data, 1972. Rocky Mountain Forest Experimental Station, Fort Collins, Colorado. U.S. Department of Agriculture, Forest Service. Unpublished Report. Albuquerque District Office.

Site-Type, Yearly Perennial Grass Production

Year	P-J	Grass-Rocky Slope	Upland Grass	Outwash Transition	Alluvial Grassland	Sagebrush Grassland
1955	124.	347.	215.	188.	155.	118.
1956	60.2	91.	105.5	54.2	67.7	59.5
1957	105.2	120.	97.	109.7	94.4	71.3
Avg. (1)	96.5	186.	139.2	117.3	105.6	82.9
1958	220.	250.	215.	188.	155.	118.
1959	211.	208.	228.	150.	209.	167.
1960	359.	183.	108.	192.5	180.4	158.1
1961	217.	389.	211.	210.	278.	189.
1962	284.	573.	244.	279.	354.	252.
1963	252.	350.	260.	297.	357.	134.
Avg. (2)	257.	325.5	211.	219.	255.6	169.7
1964	300.2	529.	315.2	440.1	897.4	182.1
1965	261.2	237.	319.4	430.6	731.7	175.3
1966	326.6	502.	349.6	512.1	867.3	265.1
1967	395.	599.	328.6	448.2	812.4	374.
1968	404.	719.	388.	571.	798.	372.
1969	588.	925.	629.	661.	975.	488.
Avg. (3)	379.2	585.2	388.2	510.5	847.	309.4
1970	503.	800.	563.	685.	853.	414.
1971	424.	675.	467.	525.	652.	276.
Avg. (4)	463.5	737.	515.	605.	752.5	345.

Source: San Luis Watershed Study Data, 1972. Rocky Mountain Forest Experimental Station, Fort Collins, Colorado. U.S. Department of Agriculture, Forest Service, Unpublished Report. Albuquerque District Office.

Appendix I-2 (continued)

COMPARISON OF WATERSHEDS 2 (WINTER GRAZING) AND 3 (TOTAL NON-USE) FOR CHANGES IN GROUND COVER

San Luis
Ground Cover Index of Principal Ground Cover[1]

Percent

	Water-Shed	Year	Galleta Grass	Alkali Sacaton	Blue Grama	Total Grasses	Total Vegetation	Rock	Litter	Bare	Production Major Perennial Grasses, pounds/acre
Winter Grazing Period	II	1964	3.99	4.21	1.10	9.30	11.49	10.49	7.01	71.01	497.4
		1969	3.47	3.64	1.33	8.44	11.21	13.63	16.42	58.74	721.0
		1971	3.01	4.08	1.60	8.69	10.38	13.47	17.22	58.93	468.0
Total Non-Use Period	III	1964	3.53	4.18	.54	8.25	10.19	6.29	5.24	78.28	424.4
		1969	2.87	3.85	.77	7.49	13.03	8.85	14.11	64.01	725.0
		1971	2.42	3.35	.72	6.49	6.62	8.67	16.35	68.36	431.0

---

[1] Occurrence of a basal portion of a plant, litter, bare soil or rock within 3/4" loops placed at 1 ft. intervals along a 100 ft. transect. Litter, bare soil, or rock must occupy half or more of the loop area to be counted (from Parker).

Source: San Luis Watershed Study Data, 1972. Rocky Mountain Forest Experimental Station, Fort Collins (Headquarters), Colorado. U.S. Department of Agriculture, Forest Service. Unpublished Report. Albuquerque District Office.

APPENDIX I-3

EXISTING AND PROPOSED ALLOTMENT NAMES AND NUMBERS

Proposed Allotments		Allotments As They Existed Before Proposed Action
Arroyo Alamito	45	Aker Pasture, 78
Arroyo Empedrado	36	Empedrado, 58; Max Tachias, Sr., 86
Arroyo Piedra Parada	54	Ojo de Espiritu, 82; Garcia, 89
Azabache	42	Section Allotment, 57; Keith Elkins, 56
Bama	21	Bama (unallotted) Unnumbered
Banco de la Casa	52	Canon Tapia, 96; C&R Griego, 70; Romero Bros., 71; Casa Salazar, 75
Brandy	10	Piedra Lumbre, 29; San Luis Place, 52; Senorita, 14; Smokey, 20; Valle, 10; La Ventana, 15
Cabezon Peak	44	Cabezon Community, 63; Pula Pasture, 76
Cachulie	39	Hack Wiseman, 46
Canada Candelaria	31	Manuel Montoya, 37; Ignacio Velarde, Est., 42
Canon del Camino	53	Garcia, 69
Cebo Community	33	Cebo Community, 47
Cerro Colorados	32	Hack Wiseman, 46
Cerro Cuate	41	Cerro Cuate, 59
Chico Crossing	43	Chico Crossing, 61
Chiuilla Community	7	Chiuilla Community, 8
Coal Creek	29	Padilla Bros., 34
Continental Divide	1	Gutierrez Family, 5; South Divide, 6
Corrales Tierra	55	Corrales Tierra, 81
Cucho Arroyo	57	F. Sandoval, 83
Dry Springs	5	Dry Springs, 4
Dry Well	27	Guillermo Maestas, 32; S. Casaus, 36; Andres Maestas, 28; Ubaldo Maestas, 31
Eagle Mesa	23	Eagle Mesa, 17
El Banquito	49	El Banquito, 65
Elk Springs	30	Elk Springs, 35
Fork Rock Mesa	16	Chacon, 19
Forty-four	18	Louis Wiese, 22
Guadalupe Community	47	Guadalupe Community, 62; Elfego Aranda, Jr., 74
Gypsum Hill	61	Zia Pueblo, 88
Horn Arroyo	9	Rudolph Velarde, 9
Ignacio Chavez Grant	50	Sifredo Romero, 94; Ojo del Padre, 66; Vidal Loddy, 68; Cerro Tinaja, 73
Lagunitas	12	Lagunitas, 12
Los Pinos Arroyo	26	Los Pinos, 27
Lost Valley	40	San Luis Pasture, 77; M&S Montoya Grant, 55; State Section, 95
Mesa Cortada	48	Ignacio Chavez Grant, 64

Existing and Proposed Allotment Names and Numbers (continued)

Proposed Allotments		Allotments As They Existed Before Proposed Action
Mesa Portales	17	De Herrera Bros., 21
Mighty Mite	58	Macario Maestas, 84
Molino	13	G. Montoya, 43
Nacimiento	14	Procopio Ramirez, 13; Max Carabajal, 26
North San Luis Mesa	37	Aparcio Lovato, 54, San Luis Mesa, 49; North Pasture, 51
Ojo de los Pinos	8	A&A Cattle Co., 39
Pelon	3	Pelon, 1
Penistaja	11	Eugene Johnson, 11; Broderick Place, 30
Piedra Lumbre	28	Guadalupe Trujillo, 41; Jose A. Garcia, Est., 38
Pipeline	56	Fermin Marquez, 93; Christianson Pasture, 80
Rio Salado Community	59	Henry Perea, 90; San Ysidro Community, 91; D. Lucero, 87; Manuelito Garcia, 92
Ridge Top	24	S. V. Houston Est., 33
Rock House	60	Tenorio Community, 85
Rock Ridge	25	Marquez and Barboa, 40
Salado-Tapia	51	Cerro Salado, 67; E. B. Sanchez, 72
San Luis Community	38	San Luis Community, 53
San Miguel	22	John Segura, 45
San Pablo	20	Juan Maestas, 44; San Pablo, 25; Wilson Canyon, 24
San Ysidro Pasture	46	San Ysidro Pasture, 79
Senorito	19	Vigil Bros., 23
Shroyer	2	Shroyer Community, 7
Starr	4	Starr Community, 2
Torreon Wash	35	Torreon Wash, 50
Tres Hermanos	6	Martinez Bros., 3
Twin Butte	34	E. Lovato, 48; Robert Taylor, 60
Valle San Isidro	15	Sisto Sandoval, 16; Salaz Bros., 18

Source: Existing Allotment Files and
AMP Files for the Proposed Action

Appendix I-4

Land Use Trends

A study recently completed (1975) by the University of New Mexico Bureau of Business and Economic Research for the New Mexico State Planning Office has compiled the most current and potentially accurate indication of recreation use patterns for the State. The survey and subsequent demand projections were prepared by State Planning Districts which theoretically guarantee a more reflective indication of existing use patterns and demand by subdivisions within the State. Several tables characterize recreation participation and demand patterns in Planning Area 3 which includes the Rio Puerco ES Area. Although much of the material presented results from survey data aggregated on a statewide basis, the information is nevertheless still highly reflective of general participation trends by State residents and demand for the ES Area.

Table II shows the basic overall results of the 1975 survey. Obviously, not all activities identified in the survey are actually conducted on public lands, particularly the ES Area. However, the data is useful in order to place known activities on public lands in proper perspective.

By using three different measurements, Table A-1 delineates (1) individuals; (2) families; and (3) total number of times an activity occurred. The activities were ranked by absolute response rates. The distinction between participation by individuals and families is also illustrated in Table II.

Table A-2 ranks all 35 outdoor recreation activities listed on the survey by family participation. As shown, the activities are ranked by planning district. The ranking is according to absolute family participation rates, but it should be noted that such ranking cannot be used to make relative measures. Consequently, the rankings may indicate large differences in participation levels where none exist. With few exceptions, the most popular activities in the ES Area remain so in each planning area throughout the State, supportive of the previous argument that the aggregated survey data is reflective of the ES Area's use trends and demand projections.

The most popular recreation activities by occasions are shown in Table A-3. Table A-3 is included for illustrative and comparative purposes. Comparing the most popular family activities (Table A-2) with the most popular activities by occasions, shows there are substantial differences in the ranked activities. This is explained by Table A-4 which shows a clear relationship between activities that usually require little traveling to the activity site, and the number of times participated.

Table A-1

Popularity Rating of Ten Top Activities (Statewide) (Rank Order)

1	By total individuals	Picknicking
	By total families*	Picknicking
	By total number of times	Bicycling
2	By total individuals	Park visits
	By total families	Park visits
	By total number of times	Pleasure walking
3	By total individuals	Attending sporting events
	By total families	Attending sporting events
	By total number of times	Jogging
4	By total individuals	Sightseeing
	By total families	Pleasure walking
	By total number of times	Pool swimming
5	By total individuals	Pool swimming
	By total families	Bicycling
	By total number of times	Park visits
6	By total individuals	Camping
	By total families	Fishing
	By total number of times	Horseback riding
7	By total individuals	Visiting historical sites
	By total families	Pool swimming
	By total number of times	Birdwatching
8	By total individuals	Fishing
	By total families	Pool swimming
	By total number of times	Tennis
9	By total individuals	Bicycling
	By total families	Visiting historical sites
	By total number of times	Baseball
10	By total individuals	Pleasure walking
	By total families	Camping
	By total number of times	Attending sporting events

---

*Participation by a family is defined as participation in an activity by one or more members of a family.

Table A-2
Most Popular Family Activities
Planning District 3
(Rank Order)

Activity		Activity	
Picnicking*	1	Small Game Hunting*	22
Park Visits	2	Lake or River Swimming	25
Attending Sporting Events	3	Boating	20
Pleasure Walking*	4	Rock Hounding*	26
Bicycling	6	Snow Skiing	19
Fishing*	8	Football	21
Pool Swimming	5	Backpacking*	23
Sightseeing*	7	Sport Shooting	29
Visiting Historical Sites*	9	Trailbiking/4-Wheeling*	28
Camping*	10	Birdwatching*	31
Big Game Hunting*	16	Water Skiing	27
Tennis	11	Rock Climbing	30
Baseball	15	Sledding	24
Hiking*	12	Caving	32
Photography/Painting*	14	Rodeos	34
Horseback Riding*	18	X-Country Skiing	33
Jogging	13	Snowmobiling	35
Golfing	17		

* These activities occur on public lands.

Table A-3
Most Popular Activities By Occasions
Planning District 3
(Rank Order)

Activity		Activity	
Bicycling	1	Trailbiking/4-Wheeling	20
Pleasure Walking	2	Camping	21
Jogging	3	Visiting Historical Sites	19
Pool Swimming	4	Small Game Hunting	23
Park Visits	5	Lake or River Swimming	27
Horseback Riding	8	Snow Skiing	24
Birdwatching	7	Boating	26
Tennis	6	Big Game Hunting	29
Baseball	9	Rock Climbing	25
Attending Sporting Events	11	Backpacking	28
Photography/Painting	12	Water Skiing	31
Fishing	15	Sledding	30
Picnicking	14	Rodeos	33
Sightseeing	13	Caving	32
Golfing	10	X-Country Skiing	34
Football	16	Snowmobiling	35
Sport Shooting	22		
Rock Hounding	18		
Hiking	17		

Table A-4

Number of Times Participants Engage in Each Activity (Statewide) (Per Year)

	Activity	Times Per Year
1.	Jogging	83
2.	Birdwatching	63
3.	Bicycling	59
4.	Pleasure Walking	50
5.	Baseball	29
6.	Golfing	28
7.	Horseback Riding	25
8.	Photography/Painting	24
9.	Football	23
10.	Tennis	22
11.	Trailbiking/4-Wheeling	20
12.	Sport Shooting	16
13.	Pool Swimming	14
14.	Rock Hounding	13
15.	Small Game Hunting	10
16.	Rodeos	9
17.	Park Visits	8
18.	Snow Skiing	7
	Attending Sporting Events	7
19.	Fishing	6
	Hiking	6
	X-Country Skiing	6
20.	Sightseeing	5
	Backpacking	5
	Rock Climbing	5
21.	Lake or River Swimming	4
22.	Water Skiing	3
	Boating	3
	Picnicking	3
	Caving	3
	Camping	3
	Big Game Hunting	3
	Visiting Historical Sites	3
23.	Sledding	2
	Snowmobiling	2

Table A-5 places much into perspective. It shows the mean distance families may travel to participate in an activity. A clear inverse relation is seen between distance to the activity site and the times participated per year (Table A-4).

It is apparent upon examination of the data, that the present volume of recreation use in the Rio Puerco ES Area is suspected to be moderate to light, depending on the nature of the activity and point of origin of the participant. Other factors contributing to the light utilization of much of the area is frequent difficult accessibility, lack of water and a limited general knowledge of potential recreation opportunities there.

Up to this point, the information has been relatively more illustrative than quantitative, since it was primarily included for comparative purposes. The tables do, however, reveal which outdoor recreation activities are important, as determined by participation, in New Mexico. The following information, on the other hand, is quantitative and shows the actual current and projected demand patterns.

Table A-6 presents current demand (1975) for outdoor recreation activities by Planning District. As noted, pleasure walking ranks substantially above other activities and is a very popular activity in the State. Table A-7 is a statewide aggregate of the same data.

Table A-8 projects the relative demand for outdoor recreation activities through 2000 in Planning District 3 (Rio Puerco ES Area). The demand figures shown reflect a constant participation factor which was derived from the survey data. In consequence, the relative positions of the activities shown in Table A-8 remain throughout the ES Area calculations. In reality, however, it must be noted that the relative positions of the activities may change over time as a function of population, activity popularity variability, and resource carrying levels.

In conclusion, Tables A-6 and A-8 constitute the primary values for purpose of the study. The data clearly illustrates the recreation land use patterns of the ES Area, and given the limitations noted by the researchers, the projections should enable planners to anticipate demand for those activities shown. Out-of-state use/demand levels were not included in the data. A discussion of out-of-state residents' demand is dealt with in the State Planning Office's report, but it is not discussed in this study for purpose of brevity.

Table A-5

Mean Distance Travelled (One-way) Per Activity (Statewide)

Activity	Mean One-way Distance Excluding Local Participation (Miles)	Participants Who Engage in Activity Locally (Percent)
Water Skiing	134	3.5
Visiting Historical Sites	127	2.8
Camping	123	0.6
Boating	122	2.4
Big Game Hunting	114	2.3
Sightseeing	113	3.6
Photography/Painting	107	39.5
Rodeos	96	26.9
Fishing	95	7.1
Backpacking	94	0.5
Lake or River Swimming	86	12.6
Snowmobiling	83	10.0
Caving	79	3.9
Park Visits	78	64.6
Birdwatching	77	74.6
Rock Hounding	76	20.9
Snow Skiing	71	3.2
Trailbiking/4-Wheeling	67	28.1
Hiking	66	14.4
Rock Climbing	65	14.1
X-Country Skiing	61	2.5
Small Game Hunting	59	12.9
Attending Sporting Events	59	75.9
Picnicking	50	17.8
Sledding	43	17.5
Golfing	41	85.8
Sport Shooting	38	42.0
Horseback Riding	33	60.7
Football	30	82.3
Pleasure Walking	29	94.1
Pool Swimming	27	87.4
Baseball	26	87.4
Tennis	25	93.5
Jogging	12	97.2
Bicycling	5	95.4

Table A-6

Current Demand for Outdoor Recreation Activities
Planning District 3

Activity	Planning District 3
Park Visits	1,945,664
Visiting Historical Sites	422,573
Photography/Painting	1,051,006
Birdwatching	1,394,103
Sightseeing	925,059
Picnicking	786,083
Camping	394,444
Backpacking	111,180
Hiking	427,351
Trailbiking/4-Wheeling	174,588
Caving	64,145
Rock Climbing	138,541
Rock Hounding	424,745
Attending Sporting Events	1,097,910
Rodeos	46,470
Baseball	1,129,180
Football	495,102
Tennis	1,624,282
Golfing	1,116,151
Sport Shooting	338,754
Jogging	4,256,140
Bicycling	8,694,686
Pleasure Walking	7,487,332
Horseback Riding	1,249,915
Pool Swimming	2,340,877
Lake or River Swimming	114,655
Boating	127,684
Water Skiing	78,608
Big Game Hunting	98,151
Small Game Hunting	247,551
Fishing	634,078
Snow Skiing	217,150
X-Country Skiing	33,875
Snowmobiling	7,817
Sledding	90,768

*As no responses were indicated for that activity a derivation of current demand could not be made for that planning district.

Table A-7

Current Demand for Outdoor Recreation Activities (Statewide)

Activity	Occasions Demanded* - 1975
1. Bicycling	19,218,322
2. Pleasure Walking	15,291,817
3. Jogging	8,489,467
4. Pool Swimming	4,941,245
5. Park Visits	4,454,080
6. Horseback Riding	3,543,732
7. Birdwatching	3,303,517
8. Tennis	3,193,512
9. Baseball	3,102,590
10. Attending Sporting Events	2,869,110
11. Photography/Painting	2,430,212
12. Fishing	2,152,955
13. Sightseeing	2,102,422
14. Picnicking	2,101,320
15. Golfing	2,000,295
16. Football	1,179,747
17. Rock Hounding	1,123,622
18. Hiking	1,061,885
19. Trailbiking/4-Wheeling	1,060,762
20. Camping	938,410
21. Visiting Historical Sites	883,407
22. Small Game Hunting	746,462
23. Sport Shooting	731,870
24. Lake Or River Swimming	602,782
25. Snow Skiing	518,595
26. Boating	450,122
27. Big Game Hunting	352,465
28. Rock Climbing	306,442
29. Backpacking	291,850
30. Water Skiing	223,377
31. Sledding	205,417
32. Rodeos	173,987
33. Caving	141,435
34. X-Country Skiing	52,757
35. Snowmobiling	29,185

*The term demand is used as a measurement of participation levels.

Table A-8

Demand Projections--Planning District 3

Activity	1980	1985	1990
Park Visits	2,190,000	2,388,000	2,593,000
Visiting Historical Sites	477,000	520,000	564,000
Photography/Painting	1,186,000	1,293,000	1,404,000
Birdwatching	1,573,000	1,714,000	1,862,000
Sightseeing	1,043,000	1,138,000	1,236,000
Picnicking	887,000	967,000	1,050,000
Camping	445,000	485,000	527,000
Backpacking	125,000	137,000	148,000
Hiking	482,000	526,000	571,000
Trailbiking/4-Wheeling	197,000	215,000	233,000
Caving	73,000	80,000	87,000
Rock Climbing	156,000	170,000	185,000
Rock Hounding	479,000	522,000	567,000
Attending Sporting Events	1,239,000	1,350,000	1,467,000
Rodeos	52,000	57,000	62,000
Baseball	1,274,000	1,389,000	1,508,000
Football	559,000	609,000	661,000
Tennis	1,833,000	1,998,000	2,170,000
Golfing	1,259,000	1,373,000	1,491,000
Sport Shooting	382,000	417,000	453,000
Jogging	4,802,000	5,235,000	5,686,000
Bicycling	9,811,000	10,693,000	11,615,000
Pleasure Walking	8,448,000	9,209,000	10,002,000
Horseback Riding	1,410,000	1,538,000	1,669,000
Pool Swimming	2,641,000	2,879,000	3,127,000
Lake or River Swimming	127,000	139,000	151,000
Boating	144,000	157,000	171,000
Water Skiing	89,000	97,000	105,000
Big Game Hunting	111,000	121,000	131,000
Small Game Hunting	279,000	304,000	331,000
Fishing	715,000	780,000	847,000
Snow Skiing	245,000	267,000	290,000
X-Country Skiing	38,000	42,000	45,000
Snowmobiling	9,000	10,000	11,000
Sledding	102,000	111,000	121,000

APPENDIX II-1

CANDIDATES FOR THE NEW MEXICO THREATENED AND ENDANGERED PLANT LISTS AS PUBLISHED IN THE FEDERAL REGISTER

Species	Common Name	Status as of July 1, 1975	Status as of June 16, 1976
Erigeron rhizomatus	Fleabane	E	E
Helianthus paradoxus	Sunflower	E	E
Lesquerella aurea	Golden bladderpod	E	E
Lesquerella lata	Bladderpod	-	E
Lesquerella valida	Bladderpod	E	E
Echinocereus hempelii	Hedgehog cactus	-	E
Echinocereus lloydii	Hedgehog cactus	E	E
Pediocactus knowltonii	N.C.N.	E	E
Sclerocactus mesae-verdae	N.C.N.	T	E
Silene plankii	N.C.N.	E	E
Astragalus castetteri	Castetter's milkvetch	E	E
Astragalus siliceus	Milkvetch	E	E
Petalostemum scariosum	Prairie clover	E	E
Argemone pleiacantha	Prickly poppy	E	E
Polygala rimulicola	N.C.N.	E	E
Eriogonum gypsophilum	Wild buckwheat	E	E
Aquilegia chaplinei	Wild columbine	E	E
Scrophularia coccineas	Figwort	-	E
Coryphantha sneedii var. sneedii	N.C.N.	T	E
Coryphantha triglochidiatus var. inermis	N.C.N.	-	E

E = Endangered
T = Threatened
NCN = No Common Name

Source: Federal Register, July 1, 1975 and June 16, 1976

APPENDIX II-2

DEFINITIONS OF HABITAT CONDITIONS FOR MULE DEER

Good (big game habitat):

An evaluation of big game habitat conditions, using data obtained from forage condition surveys for a particular big game species, and using the following criteria for evaluation:

1. Composition

   Desirable and intermediate forage species (two or more) making up 75 percent or more of the composition, with desirables at least 45 percent of the composition.

2. Density*

   Density of forage greater than 36 percent.

3. Vigor

   Hedging of key species mostly light or moderate, with less than 16 percent of the plants heavily hedged, and decadent, minus young plants, less than 16 percent of the total number of plants.

Fair (big game habitat):

An evaluation of big game habitat conditions, using data obtained from forage condition surveys for a particular big game species, and using the following criteria for evaluation:

1. Composition

   Desirable and intermediate forage species making up 50 percent or more of the composition, with desirables at least 15 percent of the composition.

2. Density*

   Density of forage 16 percent to 35 percent.

3. Vigor

   Hedging on key forage species mostly moderate, 16 percent to 35 percent heavily hedged; or decadent, minus young plants, 16 percent to 35 percent.

Poor (big game habitat):

An evaluation of big game habitat conditions, using data obtained from forage condition surveys for a particular big game species, and using the following criteria for evaluation:

1. Composition

   Desirable and intermediate forage species making up less than 50 percent of the composition.

2. Density*

   Density of forage 15 percent or less.

3. Vigor

   More than 35 percent of the key forage species heavily hedged or decadent, minus young plants, more than 35 percent.

*Density in this context refers to total crown cover rather than basal cover. No relationships between crown density and basal density can be drawn; separate measurements must be performed.

Source: USDA; USDI; State of New Mexico Game and Fish, undated.

APPENDIX II-3

VISUAL RESOURCE MANAGEMENT CLASSES

The Visual Resource Management (VRM) units and VRM classes discussed in Chapter II and the visual resource contrast ratings as discussed in BLM Manual 6320 are the basis for evaluating the environmental impacts of the proposed action.

Impacts to the visual resources are based on a contrast rating system. The degree to which a management activity adversely impacts the visual quality of the landscape depends upon the amount of visual contrast that is created between the activity and the existing landscape character. This contrast is measured by separating the landscape into its major features (land and water surface, vegetation, and structures) and predicting the magnitude of change in contrast for each feature. The contrast rating will serve as a guide in determining what is required to reduce the contrast to the point where it will meet the objectives of the visual resource management classes for the area. The severity of the impact on the visual resources from any action would depend on the class in which the action occurs.

There are four of the five possible VRM classes in the Rio Puerco ES Area, I, II, III, and IV. The objectives of these VRM classes in terms of modification are as follows:

Class I - no modification to the basic elements;

Class II - modification of the basic elements should not be evident;

Class III - modification of the basic elements may be evident but should remain subordinate; and

Class IV - modifications may subordinate the original landscape character but must reflect what could be a natural occurrence.

Application of the contrast rating system from the most critical viewpoint must keep the following variables in mind to determine how well the contrast is seen:

(1) distance from which the project is viewed;

(2) angle of observation;

(3) length of time the project is in view;

(4) relative size or scale of the project in relation to its surroundings;

(5) season of the year and effects of seasonal change; light and how it would affect the project being viewed; and the effect time has on the healing process.

A contrast rating was made for each project category evaluating the degree of change in form, line, color, and texture of the major features. The basic elements have been weighted as follows to indicate their relative importance in detecting changes in contrast: form (4), line (3), color (2), and texture (1). By assigning values that indicate degree of contrast, 3 for strong, 2 for moderate, 1 for weak and 0 for none, a direct multiplier for an indication of the strength of the contrast can be set up. For example, if the construction of a water storage tank would create a strong change in form of the area, the following calculation would indicate the strength of the contrast, i.e., (form (4)) x (strong (3)) = 12. In this example, the degree of contrast for change in form is 12. This would be added to the degree of contrast for the other three basic elements for the total contrast rating.

A total contrast rating is prepared for each of the major features involved (land and water surface, vegetation, and structures) and the total ratings for each are accumulated for an aggregate rating. Each feature has a maximum score of 30 so the maximum total rating would be 90 if all features are rated. Standards for meeting visual resource management classes are as follows:

Class I - The degree of contrast for any one element may not exceed 1 (weak) and the total contrast rating for any feature must be less than 10.

Class II - The degree of contrast for any one element should not exceed 2 (moderate) and the total contrast rating for any feature may not exceed 10.

Class III - The degree of contrast for any one element should not exceed 2 (moderate) and the total contrast for any one feature may not exceed 16.

Class IV - The total contrast rating for any feature should not exceed 20.

A total score for each feature of 1 to 10 indicates the contrast can be seen, but does not attract attention; 11 to 20 attracts attention and the contrast begins to dominate the characteristic landscape; 21 to 30 demands attention, will not be overlooked.

RECREATION QUALITY EVALUATION SCORESHEETS

A RATING AREA MAY BE PLOTTED AS :

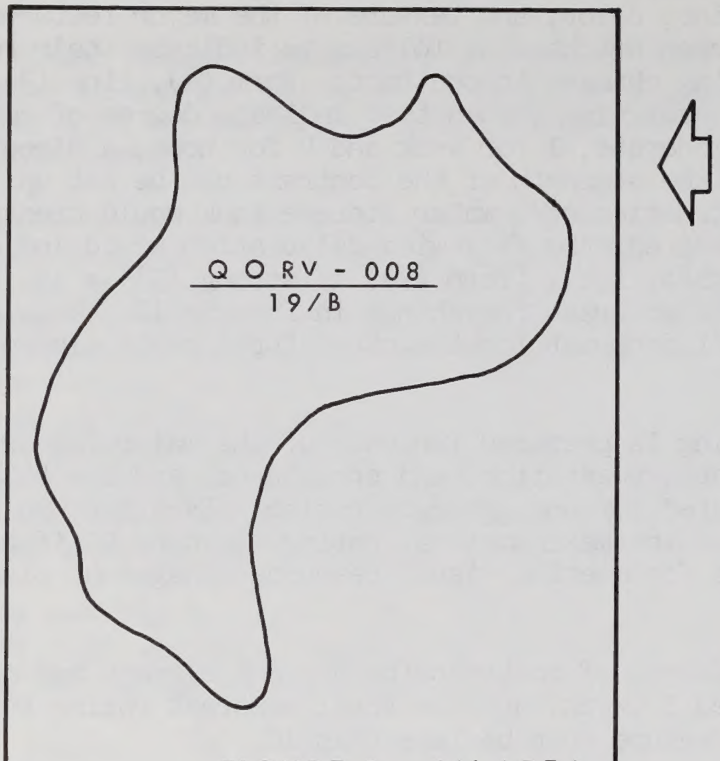


FIGURE 1 : AN AREA

Q - QUALITY EVALUATION
O - SPECIALIZED ACTIVITIES
RV - OFF-ROAD VEHICALS
008 - RATING AREA NUMBER
19 - SCORE
B - QUALITY RATING

Q - QUALITY EVALUTION
S - SIGHTSEEING
AR - ARCHEOLOGICAL
371 - RATING AREA (SITE) NUMBER
9 - SCORE
C - QUALITY RATING

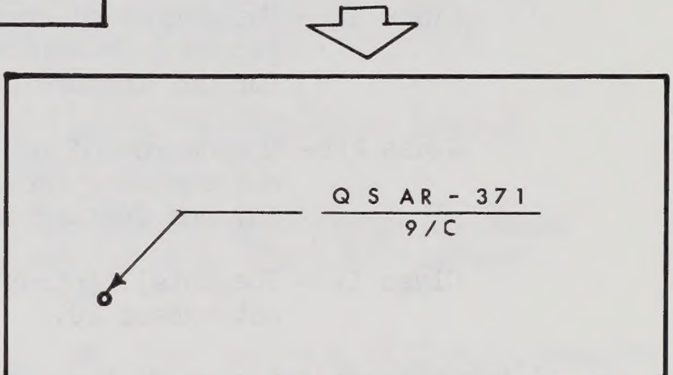


FIGURE 2 : A POINT

Q - QUALITY EVALUATION
F - FISHING
ST - STREAM
061 - RATING AREA NUMBER
11 - SCORE
A - QUALITY RATING

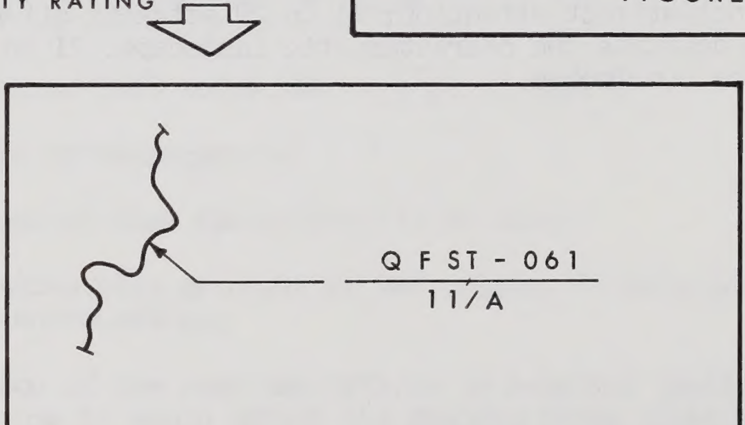


FIGURE : A LINE

APPENDIX II-4

Appendix II-4

CODE DESIGNATIONS

1	2	3	4	5
Function	Activity	Subactivity	Numerical Identifier	Ownership

Functional Designations

Quality Evaluation............Q
Visitor Use Evaluation........V
Usability Evaulation..........U

Recommendation Area (URA-MFP).R

Ownership Designations

BLM...........................B
Other Federal.................F
State.........................S
Private.......................P
Joint.........................J

Activity Designations

Major Activities

Subactivities

FISHING	F
Stream	Fst
Lake	Flk
Ocean	Foc
Other	Fot
HUNTING	H
Big game	Hbg
Small game	Hsg
Upland game	Hug
Water fowl	Hwf
Other	Hot
WINTER SPORTS	T
Skiing	Tsk
Snow Play	Tsp
Other	Tot
WATER SPORTS	W
Powerboating	Wpb
Sailboating	Wsb
Floatboating	Wfb
Swimming	Wsw
Other	Wot
COLLECTING	C
Vegetative	Cvg
Rocks & Minerals	Crm
Other	Cot

SIGHTSEEING	S
General	Sgn
Scenery	Sec
Historical	She
Archeological	Sar
Other Cultural	Soc
Geological	Sgo
Botanical	Sbo
Zoological	Szo
Other	Sot
SPECIALIZED ACTIVITIES	O
Off-Road Veh.	Orv
Other	Oot
GENERAL LEISURE	G
Camping	Gcp
Picnicking	Gpc
Other	Got
PRIMITIVE VALUES	P
Primitive	Ppr
Back Country	Pbc
Other	Pot

1. Date 1976 March
2. Rater BS
3. State NM
4. District Albuquerque
5. Plan Unit Rio Puerco ES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

QUALITY EVALUATION SCORESHEET

6. Recreation Activity QOrv
ORV Use

CLASS	SCORE RANGE
	7
A	22 - 26
B	18 - 21
C	6 - 17

8. KEY FACTORS

9. RATING AREA NO. (a)	NAME (b)	10. POINT MAXIMUM Usable	Soil	Size	Hazards	11. TOTAL SCORE	12. CLASS	13. REMARKS
001	Ignacio Chavez Grant							
	West Area	2	4	4	6	16	C	
002	Ignacio Chavez Grant							
	East Area	2	2	4	6	14	C	
003	Rio Puerco Drainage	4	6	4	4	18	B	
004	M&S Grant	4	4	3	4	15	C	
005	Mineral Springs Area	6	6	2	4	18	B	
006	Bernalillo Arroyo	6	6	4	6	22	A	
007	Chico Arroyo Area	8	6	4	6	24	A	
008	Continental Divide	6	4	3	4	17	B	
009	Mesa San Luis	8	6	4	6	24	A	
010	La Ventana Mesa	8	4	4	4	20	B	
011	Mesa Portales	6	6	4	4	20	B	
012	Mesa Chiuilla	4	4	2	4	14	C	
013	Mesa de Cuba	4	4	2	4	14	C	
014	San Isidro Valley	6	4	4	4	18	B	

(Instructions on reverse)

Form 6110-10 (August 1972)

1. **Date** 1976 March
2. **Rater** BS
3. **State** NM
4. **District** Albuquerque
5. **Plan Unit** Rio Puerco ES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

QUALITY EVALUATION SCORESHEET

6. **Recreation Activity** QSsc

Sightseeing - scenery

CLASS	SCORE RANGE
7	
A	15 - 24
B	10 - 14
C	1 - 9

8. **KEY FACTORS**

9. RATING AREA		10. POINT MAXIMUM										
NO. (a)	NAME (b)	Landform	Color	Water	Vegetation	Uniqueness	Intrusions			11. TOTAL SCORE	12. CLASS	13. REMARKS
001	Ignacio Chavez Grant West Area	4	2	1	4	2	2			15	A	
002	Ignacio Chavez Grant East Area	4	2	1	4	6	2			19	A	
003	Rio Puerco Drainage	2	2	1	2	4	2			13	B	
004	M&S Grant	2	2	1	1	2	1			9	C	
005	Mineral Springs Area	4	4	2	4	6	2			22	A	
006	Bernalillo Arroyo	1	1	2	1	1	1			7	C	
007	Chico Arroyo Area	2	2	2	2	2	2			12	B	
008	La Ventana Mesa	4	2	1	2	2	1			12	B	
009	Mesa Portales	4	2	1	2	2	1			12	B	
010	San Isidro Valley	1	1	1	1	1	1			6	C	
011	Mesa de Cuba	4	4	1	2	2	2			15	A	
012	Mesa Chiuilla	2	2	1	2	2	2			11	B	
013	Mesa San Luis	2	2	1	1	1	2			9	C	
014	Continental Divide	2	1	1	2	1	1			8	C	

(Instructions on reverse)

Form 6110-10 (August 1972)

1. Date 1976 March
2. Rater RS
3. State NM
4. District Albuquerque
5. Plan Unit Rio Puerco ES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

QUALITY EVALUATION SCORESHEET

6. Recreation Activity Qsgo

Sightseeing - Geological

CLASS	SCORE RANGE
7	
A	16 - 20
B	11 - 15
C	5 - 10

8. KEY FACTORS

9. RATING AREA		10. POINT MAXIMUM										
NO. (a)	NAME (b)	Freq. of Occu.	Extent	Form	Repre. Type	Color				11. TOTAL SCORE	12. CLASS	13. REMARKS
		4	4	4	4	4						
001	Ignacio Chavez Grant											
	West Area	3	3	2	3	3				14	B	
002	Ignacio Chavez Grant											
	East Area	3	3	3	3	3				15	B	
003	Cabezon Area	3	3	4	3	3				16	A	
004	Mineral Springs Area	4	3	3	3	3				16	A	
005	La Ventana Mesa	1	3	2	3	3				12	B	
006	Mesa de Cuba	2	3	2	2	3				12	B	

(Instructions on reverse)

Form 6110-10 (August 1972)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

QUALITY EVALUATION SCORESHEET

1. Date 1976 March
2. Rater RS
3. State NM
4. District Albuquerque
5. Plan Unit Rio Puerco ES
6. Recreation Activity QHbg Hunting - Big Game

7

CLASS	SCORE RANGE
A	16 - 20
B	11 - 15
C	5 - 10

8. KEY FACTORS

9. RATING AREA		10. POINT MAXIMUM										
NO. (a)	NAME (b)	Game Popu.	Ease of Mvmnt.	Shooting Opp.						11. TOTAL SCORE	12. CLASS	13. REMARKS
001	Ignacio Chavez Grant	8	2	2						12	B	
002	Mineral Springs	4	2	2						8	C	
003	Continental Divide	4	2	2						8	C	
004	Mesa Chiuilla	4	2	2						8	C	

(Instructions on reverse)

Form 6110-10 (August 1972)

1. **Date** 1976 March
2. **Rater** RS
3. **State** NM
4. **District** Albuquerque
5. **Plan Unit** Rio Puerco ES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

QUALITY EVALUATION SCORESHEET

6. **Recreation Activity** QPpr

Primitive Values

CLASS	SCORE RANGE 7
A	21
B	15 - 20
C	8 - 15

8. KEY FACTORS

9. RATING AREA NO. (a)	NAME (b)	Intrusion	Scenic Quality	Wildlife	Fisheries	Water Usability	Size	Uniqueness		11. TOTAL SCORE	12. CLASS	13. REMARKS
	10. POINT MAXIMUM	6	5	3	3	6	6					
001	Ignacio Chavez Grant	4	5	2	1	1	6	4		23	A	
002	Mineral Springs Area	4	5	1	1	1	4	6		22	A	
003	Chico Arroyo	4	2	1	1	1	4	1		14	C	
004	La Ventana Mesa	4	3	2	1	1	1	3		17	B	
005	Mesa de Cuba	4	5	2	1	1	1	3		17	B	

(Instructions on reverse)

Form 6110-10 (August 1972)

APPENDIX II-5

RECREATION

Motorcycle Association of New Mexico ORV Terrain Utilization Criteria

Trail Riding: All riders savor scenic values as they ride, some more than others. Many riders enjoy the challenge of difficult terrain such as rocks, rocky ledges, sandy washes, etc. Trails should be well marked, making loops and interconnections for variety and reducing total traffic density. With proper management, vehicular use of trails is no more damaging than any other use.

Open Riding: Similar to trail riding above except not confined to designated trails. Should be limited to designated areas because alteration of terrain may result. This alteration disappears, according to the type of terrain, after use is terminated (perhaps by shifting to another area). Wasteland, arroyos, etc., are suitable. This type of riding is enjoyed by many people and is especially desirable for families who may establish a base and ride short distances in the immediate area.

Enduros: This requires an organized club or other group who will stage and control the event by marking trails, policing other riders, setting up check points, providing for assistance in case of breakdown, clean-up after the event, etc. During the Enduro, the trail should be closed to other uses. Selection of the trails should be done by the organizing club, with approval by the land managing agency, and cooperation between both is necessary in order to have a successful event. Enduros are often held only once a year in a particular area.

Hare Scrambles: Requires selection of little-used trails, jeep roads or arroyos suitable for racing. Otherwise, similar to Enduros.

Motocross: Requires designation of ten to thirty acres and permission for a sponsoring club to use. Club will construct and maintain the course. Should provide reasonable access for spectators in passenger cars and parking.

Trails: A few acres of rough, diverse terrain is all that is required. The users (club or association) will lay out sections for rider tests. This event does not involve speed, is quiet and nonhazardous. Land for a trail event can be as close as one-half mile from habitation without resulting problems. Trails are unobtrusive and quiet,and are often enjoyed by families.

APPENDIX II-6

RECREATION

HUNTING STATISTICS - NEW MEXICO GAME UNIT 14
(93 Percent of Rio Puerco ES Area)

Year	Hunters	Hunter Days	Deer Harvest	Percent Hunter Success
1959[1/]	1,032	2,686	163	15.79
1960[2/]	937	2,358	426	45.46
1961	1,549	3,210	55	10.01
1962	1,202	2,764	150	12.50
1963	1,470	3,704	219	14.00
1964	1,395	2,981	171	12.30
1965	1,368	3,610	157	11.50
1966	1,017	2,432	86	8.40
1967	973	2,164	157	16.10
1968	835	1,987	76	9.10
1969	566	814	45	7.95
1970	1,077	3/	170	15.78
1971	1,542	3/	99	6.42
1972	1,656	3/	122	7.36
1973	1,671	3/	99	5.92
1974	1,862	3/	101	5.42

1/ 1959 was buck only with last two days either sex
2/ 1960 entire season either sex
3/ No "Hunter Days" available

Source: New Mexico Game and Fish (1974)
Hunting Statistics-Unpublished
Annual Report, Fiscal 1973, Volume 68

APPENDIX III-1

IMPACTS AS CORRELATED BETWEEN RESOURCES

Resource Where Impact Is Initiated	Resource Receiving Impact Air Quality	Soils	Water Resources	Vegetation	Wildlife	Cultural Resources	Paleontology	Visual Resources	Recreation	Livestock Grazing	Mineral Resources	Forestry	Transportation	Socio-Economics
Air Quality								X	X					
Soils	X		X	X		X		X	X	X				
Water Resources		X			X					X				
Vegetation	X	X	X		X	X		X	X	X		X		X
Wildlife				X					X	X				X
Cultural Resources									X					
Paleontology									X					
Visual Resources									X					
Recreation														X
Livestock Grazing														X
Mineral Resources														
Forestry									X					X
Transportation									X		X			
Socio-Economics				X					X	X				

Source: Summarized from Chapter III

KEY TO APPENDIX III-2

Parameters.

1. The same species may be found in several vegetative sub-types.
2. The potential for a species may not be equal for all vegetative sub-types.
3. The same species will respond in a similar manner to a specific grazing treatment.

Vegetative Sub-type Symbols

PP = Ponderosa Pine
BS = Big sagebrush
FWS = Four-wing saltbush
GW = Greasewood
SG = Shortgrass
BSW = Broom snakewood
PJ = Pinyon-juniper

Factors Impacted Symbols

ST = Short-term
LT = Long-term

Degree of Impact

H+ = High plus
M+ = Moderate plus
L+ = Low plus
0 = No impact
L- = Low minus
M- = Moderate minus
H- = High minus

APPENDIX III-2

IMPACTS ON FORAGE VEGETATION FROM GRAZING AND REST TREATMENTS
REST ROTATION GRAZING SYSTEMS ON THE RIO PUERCO ES AREA

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	FACTORS IMPACTED Vigor		Litter Accumulation		Vegetative Ground Cover		Reproduction		Seedling Establishment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Yearlong Rest 111,733 Acres	No grazing for a full year	alkali sacaton	BS,FWS,GW,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		Arizona fescue	PP,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		blue grama	PP,BS,FWS,GW,SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		Carex	PP,BS,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		crested wheatgrass	BS,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		Indian ricegrass	BS,SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		galleta	BS,FWS,GW,SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		little seed ricegrass	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		mountain muhly	PP,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		mutton grass	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		pine dropseed	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		prairie Junegrass	PP,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		sand dropseed	FWS,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		spike dropseed	FWS,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		bitterbrush	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		black sagebrush	BS,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		cliffrose	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		four-wing saltbush	BS,FWS,GW,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		fringed sage	SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		gambel oak	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		mountain mahogany	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		shadscale	FWS,GW,SG	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		skunkbush	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		winterfat	SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+

				FACTORS IMPACTED															
Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Spring Rest	No grazing from 3/1 to 6/30	alkali sacaton	BS,FWS,GW,SG,BSW	M+	M+	L+	L+	L+	L+	M+	M+	0	0	0	0	0	0	M+	M+
		Arizona fescue	PP,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		blue grama	PP,BS,FWS,GW,SG,BSW,PJ	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	0	0	L+	L+
150,019 Acres		Carex	PP,BS,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		crested wheatgrass	BS,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		Indian ricegrass	BS,SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		galleta	BS,FWS,GW,SG,BSW,PJ	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		little seed ricegrass	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		mountain muhly	PP,SG,PJ	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		mutton grass	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		pine dropseed	PP,PJ	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		prairie Junegrass	PP,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		sand dropseed	FWS,SG,BSW	M+	M+	M+	M+	M+	M+	M+	M+	M+	M+	0	0	0	0	M+	M+
		spike dropseed	FWS,SG,BSW	M+	M+	M+	M+	M+	M+	M+	M+	M+	M+	0	0	0	0	M+	M+
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		bitterbrush	PP,PJ	H+	H+	L+	L+	L+	L+	L+	L+	M+	M+	0	0	0	0	H+	H+
		black sagebrush	BS,SG,PJ	H+	H+	L+	L+	L+	L+	L+	L+	M+	M+	0	0	0	0	H+	H+
		cliffrose	PP,PJ	M+	M+	L+	L+	L+	L+	L+	L+	M+	M+	0	0	0	0	M+	M+
		four-wing saltbush	BS,FWS,GW,SG,BSW	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		fringed sage	SG,BSW,PJ	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		gambel oak	PP,PJ	H+	H+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		mountain mahogany	PP,PJ	H+	H+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		shadscale	FWS,GW,SG	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		skunkbush	PP,PJ	H+	H+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		winterfat	SG,BSW	M+	M+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	FACTORS IMPACTED															
				Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Summer Rest	No grazing from 7/1 to 10/15	alkali sacaton	BS,FWS,GW,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
163,699 Acres		Arizona fescue	PP,SG,PJ	H+	H+	H+	H+	L+	L+	L+	L+	0	0	0	0	0	0	L+	L+
		blue grama	PP,BS,FWS,GW,SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		Carex	PP,BS,SG,PJ	M+	M+	M+	M+	M+	M+	L+	L+	L+	L+	0	0	0	0	M+	M+
		crested wheatgrass	BS,SG,PJ	M+	M+	H+	H+	L+	L+	H+	H+	H+	H+	0	0	0	0	L+	L+
		Indian ricegrass	BS,SG,BSW,PJ	M+	M+	H+	H+	M+	M+	L+	L+	0	0	0	0	0	0	L+	L+
		galleta	BS,FWS,GW,SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		little seed ricegrass	PP,PJ	L+	L+	M+	M+	L+	L+	0	0	0	0	0	0	0	0	L+	L+
		mountain muhly	PP,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		mutton grass	PP,PJ	L+	L+	M+	M+	L+	L+	L+	L+	0	0	0	0	0	0	L+	L+
		pine dropseed	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		prairie Junegrass	PP,SG,PJ	L+	L+	M+	M+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		sand dropseed	FWS,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		spike dropseed	FWS,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	L+	L+	M+	M+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		bitterbrush	PP,PJ	M+	M+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		black sagebrush	BS,SG,PJ	M+	M+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		cliffrose	PP,PJ	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		four-wing saltbush	BS,FWS,GW,SG,BSW	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		fringed sage	SG,BSW,PJ	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		gambel oak	PP,PH	M+	M+	M+	M+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		mountain mahogany	PP,PH	M+	M+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		shadscale	FWS,GW,SG	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		skunkbush	PP,PJ	M+	M+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		winterfat	SG,BSW	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+

				FACTORS IMPACTED															
Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Fall and Winter Rest 250,443 Acres	No grazing from 10/15 to 9/28	alkali sacaton	BS,FWS,GW,SG,BSW	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		Arizona fescue	PP,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		blue grama	PP,BS,FWS,GW,SG,BSW,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		Carex	PP,BS,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		crested wheatgrass	BS,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		Indian ricegrass	BS,SG,BSW,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		galleta	BS,FWS,GW,SG,BSW,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		little seed ricegrass	PP,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		mountain muhly	PP,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		mutton grass	PP,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		pine dropseed	PP,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		prairie Junegrass	PP,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		sand dropseed	FWS,SG,BSW	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		spike dropseed	FWS,SG,BSW	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		bitterbrush	PP,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		black sagebrush	BS,SG,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		cliffrose	PP,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		four-wing saltbush	BS,FWS,GW,SG,BSW	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		fringed sage	SG,BSW,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		gambel oak	PP,PH	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		mountain mahogany	PP,PH	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		shadscale	FWS,GW,SG	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		skunkbush	PP,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		winterfat	SG,BSW	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	FACTORS IMPACTED Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Spring Graze 108,430 Acres	Graze from 3/1 to 6/30	alkali sacaton	BS,FWS,GW,SG,BSW	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		Arizona fescue	PP,SG,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		blue grama	PP,BS,FWS,GS,SG,BSW,PJ	L-	0	L-	0	L-	0	0	0	0	0	0	0	0	0	L-	0
		Carex	PP,BS,SG,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		crested wheatgrass	BS,SG,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		Indian ricegrass	BS,SG,BSW,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		galleta	BS,FWS,GW,SG,BSW,PJ	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		little seed ricegrass	PP,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		mountain muhly	PP,SG,PJ	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		mutton grass	PP,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		pine dropseed	PP,PJ	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		prairie Junegrass	PP,SG,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		sand dropseed	FWS,SG,BSW	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		spike dropseed	FWS,SG,BSW	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	M-	0	M-	0	L-	0	M-	0	0	0	0	0	0	0	M-	0
		bitterbrush	PP,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		black sagebrush	BS,SG,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		cliffrose	PP,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		four-wing saltbush	BS,FWS,GW,SG,BSW	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		fringed sage	SG,BSW,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		gambel oak	PP,PH	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		mountain mahogany	PP,PH	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		shadscale	FWS,GW,SG	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		skunkbush	PP,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		winterfat	SG,BSW	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0

FACTORS IMPACTED

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	Vigor		Litter Accumulation		Vegetative Ground Cover		Reproduction		Seedling Establishment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Summer	Graze	alkali sacaton	BS,FWS,GW,SG,BSW	M-	0	M-	0	L-	0	M-	0	L-	0	H+	H+	0	0	M-	0
Graze	from	Arizona fescue	PP,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
	7/1 to	blue grama	PP,BS,FWS,GS,SG,BSW,PJ	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
94,750	10/15	Carex	PP,BS,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
Acres		crested wheatgrass	BS,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
		Indian ricegrass	BS,SG,BSW,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
		galleta	BS,FWS,GW,SG,BSW,PJ	M-	0	M-	0	L-	0	L-	0	M-	0	H+	H+	0	0	M-	0
		little seed ricegrass	PP,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
		mountain muhly	PP,SG,PJ	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
		mutton grass	PP,PJ	L-	0	M-	0	L-	0	M-	0	M-	0	0	0	H+	H+	M-	0
		pine dropseed	PP,PJ	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
		prairie Junegrass	PP,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
		sand dropseed	FWS,SG,BSW	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
		spike dropseed	FWS,SG,BSW	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	M-	0
		bitterbrush	PP,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	H+	H+	0	0	L-	0
		black sagebrush	BS,SG,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		cliffrose	PP,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		four-wing saltbush	BS,FWS,GW,SG,BSW	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		fringed sage	SG,BSW,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		gambel oak	PP,PH	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		mountain mahogany	PP,PH	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		shadscale	FWS,GW,SG	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		skunkbush	PP,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		winterfat	SG,BSW	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Fall	Graze	alkali sacaton	BS,FWS,GW,SG,BSW	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
Graze	from	Arizona fescue	PP,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	H+	H+	0	0
	10/15	blue grama	PP,BS,FWS,GS,SG,BSW,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
131,279	to	Carex	PP,BS,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
Acres	11/30	crested wheatgrass	BS,SG,PJ	L-	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		Indian ricegrass	BS,SG,BSW,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
Acres		galleta	BS,FWS,GW,SG,BSW,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		little seed ricegrass	PP,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		mountain muhly	PP,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		mutton grass	PP,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		pine dropseed	PP,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		prairie Junegrass	PP,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		sand dropseed	FWS,SG,BSW	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		spike dropseed	FWS,SG,BSW	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		bitterbrush	PP,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		black sagebrush	BS,SG,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		cliffrose	PP,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		four-wing saltbush	BS,FWS,GW,SG,BSW	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		fringed sage	SG,BSW,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		gambel oak	PP,PH	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		mountain mahogany	PP,PH	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		shadscale	FWS,GW,SG	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		skunkbush	PP,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		winterfat	SG,BSW	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0

Under the spanning header FACTORS IMPACTED: Vigor through Production.

				FACTORS IMPACTED															
Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	Vigor		Litter Accumulation		Vegetative Ground Cover		Reproduction		Seedling Establishment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Winter Graze 135,176 Acres	Graze from 12/1 to 2/28	alkali sacaton	BS,FWS,GW,SG,BSW	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		Arizona fescue	PP,SG,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		blue grama	PP,BS,FWS,GS,SG,BSW,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		Carex	PP,BS,SG,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		crested wheatgrass	BS,SG,PJ	L-	0	M-	0	L-	0	0	0	0	0	0	0	L+	L+	0	0
		Indian ricegrass	BS,SG,BSW,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		galleta	BS,FWS,GW,SG,BSW,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		little seed ricegrass	PP,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		mountain muhly	PP,SG,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		mutton grass	PP,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		pine dropseed	PP,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		prairie Junegrass	PP,SG,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		sand dropseed	FWS,SG,BSW	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		spike dropseed	FWS,SG,BSW	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		bitterbrush	PP,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		black sagebrush	BS,SG,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		cliffrose	PP,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		four-wing saltbush	BS,FWS,GW,SG,BSW	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		fringed sage	SG,BSW,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		gambel oak	PP,PH	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		mountain mahogany	PP,PH	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		shadscale	FWS,GW,SG	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		skunkbush	PP,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		winterfat	SG,BSW	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0

Sources: Table I-5
1975 Resource Inventory
Plant and Range Ecosystem Data, Texas Tech University.
Comparative Phenologies of 15 shrub and semi-shrub species in the Southwest, Technical Application Center, University of New Mexico
San Luis Watershed Study

APPENDIX III-2

IMPACTS ON FORAGE VEGETATION FROM GRAZING AND REST TREATMENTS DEFERRED ROTATION GRAZING SYSTEMS ON THE RIO PUERCO ES AREA

				FACTORS IMPACTED																	
Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	Vigor		Litter Accumulation		Vegetative Ground Cover		Reproduction		Seedling Establishment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Spring Rest 13,927 Acres	No grazing from 3/1 to 6/30	alkali sacaton	BS,FWS,GW,SG,BSW	M+	M+	L+	L+	L+	L+	M+	M+	0	0	0	0	0	0	M+	M+
		Arizona fescue	PP,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		blue grama	PP,BS,FWS,GW,SG,BSW,PJ	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	0	0	L+	L+
		Carex	PP,BS,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		crested wheatgrass	BS,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		Indian ricegrass	BS,SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		galleta	BS,FWS,GW,SG,BSW,PJ	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		little seed ricegrass	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		mountain muhly	PP,SG,PJ	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		mutton grass	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		pine dropseed	PP,PJ	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		prairie Junegrass	PP,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		sand dropseed	FWS,SG,BSW	M+	M+	M+	M+	M+	M+	M+	M+	M+	M+	0	0	0	0	M+	M+
		spike dropseed	FWS,SG,BSW	M+	M+	M+	M+	M+	M+	M+	M+	M+	M+	0	0	0	0	M+	M+
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		bitterbrush	PP,PJ	H+	H+	L+	L+	L+	L+	L+	L+	M+	M+	0	0	0	0	H+	H+
		black sagebrush	BS,SG,PJ	H+	H+	L+	L+	L+	L+	L+	L+	M+	M+	0	0	0	0	H+	H+
		cliffrose	PP,PJ	M+	M+	L+	L+	L+	L+	L+	L+	M+	M+	0	0	0	0	M+	M+
		four-wing saltbush	BS,FWS,GW,SG,BSW	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		fringed sage	SG,BSW,PJ	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		gambel oak	PP,PJ	H+	H+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		mountain mahogany	PP,PJ	H+	H+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		shadscale	FWS,GW,SG	L+	L+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		skunkbush	PP,PJ	H+	H+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+
		winterfat	SG,BSW	M+	M+	L+	L+	L+	L+	L+	L+	L+	L+	0	0	0	0	L+	L+

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	FACTORS IMPACTED Vigor		Litter Accumulation		Vegetative Ground Cover		Reproduction		Seedling Establishment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Summer Rest 14,583 Acres	No grazing from 7/1 to 10/15	alkali sacaton	BS,FWS,GW,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		Arizona fescue	PP,SG,PJ	H+	H+	H+	H+	L+	L+	L+	L+	0	0	0	0	0	0	L+	L+
		blue grama	PP,BS,FWS,GW,SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		Carex	PP,BS,SG,PJ	M+	M+	M+	M+	M+	M+	L+	L+	L+	L+	0	0	0	0	M+	M+
		crested wheatgrass	BS,SG,PJ	M+	M+	H+	H+	L+	L+	H+	H+	H+	H+	0	0	0	0	L+	L+
		Indian ricegrass	BS,SG,BSW,PJ	M+	M+	H+	H+	M+	M+	L+	L+	0	0	0	0	0	0	L+	L+
		galleta	BS,FWS,GW,SG,BSW,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		little seed ricegrass	PP,PJ	L+	L+	M+	M+	L+	L+	0	0	0	0	0	0	0	0	L+	L+
		mountain muhly	PP,SG,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		mutton grass	PP,PJ	L+	L+	M+	M+	L+	L+	L+	L+	0	0	0	0	0	0	L+	L+
		pine dropseed	PP,PJ	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		prairie Junegrass	PP,SG,PJ	L+	L+	M+	M+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		sand dropseed	FWS,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		spike dropseed	FWS,SG,BSW	H+	H+	H+	H+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	L+	L+	M+	M+	H+	H+	H+	H+	H+	H+	0	0	0	0	H+	H+
		bitterbrush	PP,PJ	M+	M+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		black sagebrush	BS,SG,PJ	M+	M+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		cliffrose	PP,PJ	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		four-wing saltbush	BS,FWS,GW,SG,BSW	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		fringed sage	SG,BSW,PJ	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		gambel oak	PP,PH	M+	M+	M+	M+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		mountain mahogany	PP,PH	M+	M+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		shadscale	FWS,GW,SG	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		skunkbush	PP,PJ	M+	M+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+
		winterfat	SG,BSW	H+	H+	L+	L+	L+	L+	H+	H+	L+	L+	0	0	0	0	H+	H+

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Fall and Winter Rest 12,172 Acres	No grazing from 10/15 to 9/28	alkali sacaton	BS,FWS,GW,SG,BSW	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		Arizona fescue	PP,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		blue grama	PP,BS,FWS,GW,SG,BSW,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		Carex	PP,BS,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		crested wheatgrass	BS,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		Indian ricegrass	BS,SG,BSW,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		galleta	BS,FWS,GW,SG,BSW,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		little seed ricegrass	PP,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		mountain muhly	PP,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		mutton grass	PP,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		pine dropseed	PP,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		prairie Junegrass	PP,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		sand dropseed	FWS,SG,BSW	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		spike dropseed	FWS,SG,BSW	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	0	0	M+	M+	0	0	0	0	0	0	0	0	0	0	0	0
		bitterbrush	PP,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		black sagebrush	BS,SG,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		cliffrose	PP,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		four-wing saltbush	BS,FWS,GW,SG,BSW	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		fringed sage	SG,BSW,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		gambel oak	PP,PH	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		mountain mahogany	PP,PH	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		shadscale	FWS,GW,SG	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		skunkbush	PP,PJ	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+
		winterfat	SG,BSW	M+	M+	0	0	0	0	0	0	L+	L+	0	0	0	0	M+	M+

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	FACTORS IMPACTED: Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Spring Graze 8,454 Acres	Graze from 3/1 to 6/30	alkali sacaton	BS,FWS,GW,SG,BSW	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		Arizona fescue	PP,SG,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		blue grama	PP,BS,FWS,GS,SG,BSW,PJ	L-	0	L-	0	L-	0	0	0	0	0	0	0	0	0	L-	0
		Carex	PP,BS,SG,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		crested wheatgrass	BS,SG,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		Indian ricegrass	BS,SG,BSW,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		galleta	BS,FWS,GW,SG,BSW,PJ	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		little seed ricegrass	PP,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		mountain muhly	PP,SG,PJ	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		mutton grass	PP,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		pine dropseed	PP,PJ	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		prairie Junegrass	PP,SG,PJ	M-	0	M-	0	L-	0	M-	0	L-	0	0	0	0	0	M-	0
		sand dropseed	FWS,SG,BSW	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		spike dropseed	FWS,SG,BSW	L-	0	L-	0	L-	0	L-	0	0	0	0	0	0	0	L-	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	M-	0	M-	0	L-	0	M-	0	0	0	0	0	0	0	M-	0
		bitterbrush	PP,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		black sagebrush	BS,SG,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		cliffrose	PP,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		four-wing saltbush	BS,FWS,GW,SG,BSW	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		fringed sage	SG,BSW,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		gambel oak	PP,PH	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		mountain mahogany	PP,PH	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		shadscale	FWS,GW,SG	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		skunkbush	PP,PJ	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0
		winterfat	SG,BSW	L-	0	0	0	0	0	L-	0	L-	0	0	0	0	0	L-	0

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	FACTORS IMPACTED															
				Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Summer Graze	Graze from	alkali sacaton	BS,FWS,GW,SG,BSW	M-	0	M-	0	L-	0	M-	0	L-	0	H+	H+	0	0	M-	0
	7/1 to	Arizona fescue	PP,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
7,798	10/15	blue grama	PP,BS,FWS,GS,SG,BSW,PJ	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
Acres		Carex	PP,BS,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
		crested wheatgrass	BS,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
		Indian ricegrass	BS,SG,BSW,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
		galleta	BS,FWS,GW,SG,BSW,PJ	M-	0	M-	0	L-	0	L-	0	M-	0	H+	H+	0	0	M-	0
		little seed ricegrass	PP,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
		mountain muhly	PP,SG,PJ	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
		mutton grass	PP,PJ	L-	0	M-	0	L-	0	M-	0	M-	0	0	0	H+	H+	M-	0
		pine dropseed	PP,PJ	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
		prairie Junegrass	PP,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	L-	0
		sand dropseed	FWS,SG,BSW	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
		spike dropseed	FWS,SG,BSW	M-	0	M-	0	L-	0	M-	0	M-	0	H+	H+	0	0	M-	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	L-	0	M-	0	L-	0	L-	0	L-	0	0	0	H+	H+	M-	0
		bitterbrush	PP,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	H+	H+	0	0	L-	0
		black sagebrush	BS,SG,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		cliffrose	PP,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		four-wing saltbush	BS,FWS,GW,SG,BSW	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		fringed sage	SG,BSW,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		gambel oak	PP,PH	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		mountain mahogany	PP,PH	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		shadscale	FWS,GW,SG	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		skunkbush	PP,PJ	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0
		winterfat	SG,BSW	L-	0	L-	0	L-	0	L-	0	L-	0	0	0	0	0	L-	0

Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	FACTORS IMPACTED															
				Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Fall Graze 14,961 Acres	Graze from 10/15 to 11/30	alkali sacaton	BS,FWS,GW,SG,BSW	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		Arizona fescue	PP,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	H+	H+	0	0
		blue grama	PP,BS,FWS,GS,SG,BSW,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		Carex	PP,BS,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		crested wheatgrass	BS,SG,PJ	L-	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		Indian ricegrass	BS,SG,BSW,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		galleta	BS,FWS,GW,SG,BSW,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		little seed ricegrass	PP,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		mountain muhly	PP,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		mutton grass	PP,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		pine dropseed	PP,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		prairie Junegrass	PP,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	0	0	L+	L+	0	0
		sand dropseed	FWS,SG,BSW	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		spike dropseed	FWS,SG,BSW	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	0	0	M-	0	0	0	0	0	L-	0	H+	H+	0	0	0	0
		bitterbrush	PP,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		black sagebrush	BS,SG,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		cliffrose	PP,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		four-wing saltbush	BS,FWS,GW,SG,BSW	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		fringed sage	SG,BSW,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		gambel oak	PP,PH	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		mountain mahogany	PP,PH	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		shadscale	FWS,GW,SG	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		skunkbush	PP,PJ	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0
		winterfat	SG,BSW	L-	0	0	0	L-	0	0	0	L-	0	H+	H+	0	0	L-	0

				FACTORS IMPACTED																	
Treatment and Acres	Cause	Forage Species Affected	Vegetative Sub-types Where Species Are Found	Vigor		Litter Accumula-tion		Vegeta-tive Ground Cover		Reproduction		Seedling Establish-ment		Warm Season Seed Trampling		Cool Season Seed Trampling		Production	
				ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
Winter Graze 17,629 Acres	Graze from 12/1 to 2/28	alkali sacaton	BS,FWS,GW,SG,BSW	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		Arizona fescue	PP,SG,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		blue grama	PP,BS,FWS,GS,SG,BSW,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		Carex	PP,BS,SG,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		crested wheatgrass	BS,SG,PJ	L-	0	M-	0	L-	0	0	0	0	0	0	0	L+	L+	0	0
		Indian ricegrass	BS,SG,BSW,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		galleta	BS,FWS,GW,SG,BSW,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		little seed ricegrass	PP,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		mountain muhly	PP,SG,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		mutton grass	PP,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		pine dropseed	PP,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		prairie Junegrass	PP,SG,PJ	0	0	M-	0	0	0	0	0	0	0	0	0	L+	L+	0	0
		sand dropseed	FWS,SG,BSW	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		spike dropseed	FWS,SG,BSW	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		western wheatgrass	PP,BS,FWS,GW,SG,PJ	0	0	M-	0	0	0	0	0	0	0	L+	L+	0	0	0	0
		bitterbrush	PP,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		black sagebrush	BS,SG,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		cliffrose	PP,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		four-wing saltbush	BS,FWS,GW,SG,BSW	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		fringed sage	SG,BSW,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		gambel oak	PP,PH	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		mountain mahogany	PP,PH	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		shadscale	FWS,GW,SG	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		skunkbush	PP,PJ	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0
		winterfat	SG,BSW	M-	0	0	0	L-	0	0	0	L-	0	L+	L+	0	0	L-	0

Sources: Table I-5
1975 Resource Inventory
Plant and Range Ecosystem Data, Texas Tech University.
Comparative Phenologies of 15 shrub and semi-shrub species in the Southwest, Technical Application Center, University of New Mexico
San Luis Watershed Study

APPENDIX III-3

RANGE CONDITION METHODOLOGY

Good condition: Composition is 40 percent or more of both desirable and intermediate species with at least 20 percent made up of desirable species. SSF (Soil Surface Factor) is less than 40.

Fair condition: Composition is 15 to 39 percent of desirable and intermediate species with five percent or more made up of desirable species. SSF is less than 60. (Also, those ecosystems where the composition comprises 60 percent or more of intermediate species and less than five percent desirable species will be rated "Fair condition" when the SSF is less than 60.)

Poor condition: Composition less than fifteen percent desirable and intermediate species. SSF is more than 60.

Plant lists are prepared for each BLM District classifying plants as desirable, intermediate and least desirable for each class of livestock (cattle, sheep, horses, burros).

Desirable plants are those which are palatable and productive forage species, often are dominant under or near climax conditions, are long lived, and have deep fibrous roots to protect the watershed against erosion. This category includes the important key species (grasses, forbs, and browse) which are to be maintained or increased by intensive livestock management.

Intermediate plants are of secondary importance in the climax condition. They replace the desirable plants as condition deteriorates and replace the least desirables as condition improves. They may be less desirable to grazing animals or be more resistant to grazing use.

Least desirable plants include those that are definitely the poorer species in a type or community and consist principally of invaders, noxious or low value forage plants.

Estimation of Future Range Condition

Each 1975 BLM Resource Inventory data record contained estimates of future SSF without a change in management and with a change in management. SSF changes, together with species composition, soils information, vegetative cover and total ground cover data were used in predicting future range condition classes. The San Luis Watershed data and the Range Plant and Range Ecosystem Study by Texas Tech University, also aided in predicting range condition class changes with and without changes in management.

Over 700 transect areas, each for a respective vegetative sub-type, were reviewed in estimating range condition for the present, future without the proposal, and future with the proposed 61 allotments. Acreages for respective condition classes were compiled for the three categories.

Source: Washington Instruction Memoranda
74-220 and 75-52, change 1

APPENDIX III-3

CLASSIFICATION OF KEY FORAGE PLANTS AS USED IN THE RANGE CONDITION METHODOLOGY FOR THE RIO PUERCO ES AREA

Key Forage Species	Classification Cattle	 Sheep	 Horses
Alkali sacaton	D	L	I
Arizonia fescue	D	D	D
Blue grama	D	D	D
Crested wheatgrass	D	I	D
Indian ricegrass	D	D	D
Galleta	I	I	D
Littleseed ricegrass	D	D	D
Mountain muhly	D	D	D
Mutton grass	D	D	D
Pine dropseed	D	I	D
Prairie junegrass	D	D	D
Sand dropseed	I	L	I
Spike dropseed	I	L	I
Western wheatgrass	D	I	D
Carex spp.	I	I	I
Bitterbrush	D	D	I
Black sagebrush	I	D	I
Cliffrose	I	I	I
Four-wing saltbush	D	D	D
Fringed sage	I	D	I
Gambel oak	P	D	L
Mountain mahogany	I	I	I
Shadscale	L	I	L
Skunkbush	L	L	L
Winterfat	D	D	D

Range condition classification for species:
D=Desirable
I=Intermediate
L=Least Desirable
P=Poisonous

Source: BLM Albuquerque District Office Records

APPENDIX III-4

VISUAL RESOURCE POTENTIAL CONTRAST RATINGS

Proposed Project	Feature	Element		Contrast		Score	
1. Pasture Development	Land Surface	Form (4)	x	None	=	0	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	Weak (1)	=	1	
							6
	Vegetation (Short-term)	Form (4)	x	Mod. (2)	=	8	
		Line (3)	x	Mod. (2)	=	6	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Mod. (2)	=	2	
							20
	Vegetation (Long-term)	Form (4)	x	Mod. (2)	=	8	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	Weak (1)	=	1	
							14
		Total Score					
		Short-term	26				
		Long-term	20	(Max. of 60)			
2. Fenceline Construction	Land Surface	Form (4)	x	None (0)	=	0	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	Weak (1)	=	1	
							6
	Vegetation & Structures	Form (4)	x	Weak (1)	=	4	
		Line (3)	x	Mod. (2)	=	6	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	Weak (1)	=	1	
							13
		Total Score	32	(Max. of 90)			
3. Spring Development	Land Surface	Form (4)	x	None (0)	=	0	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	Weak (1)	=	1	
							6
	Vegetation	Form (4)	x	Weak (1)	=	4	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Weak (1)	=	1	
							12

APPENDIX III-4 (continued)

Proposed Project	Feature	Element		Contrast		Score	
3. Spring Development (Cont'd)	Structures	Form (4)	x	None (0)	=	0	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	None (0)	=	0	
							5
		Total Score		23 (Max. of 90)			
4. Water Catchments	Land Surface	Form (4)	x	Weak (1)	=	4	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Weak (1)	=	1	
							12
	Vegetation	Form (4)	x	Weak (1)	=	4	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Mod. (2)	=	2	
							13
	Structures	Form (4)	x	None (0)	=	0	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Mod. (2)	=	2	
							9
		Total Score		34 (Max. of 90)			
5. Pipeline Construction	Land Surface & Vegetation	Form (4)	x	None (0)	=	0	
		Line (3)	x	Mod. (2)	=	6	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	Weak (1)	=	1	
							9
	Structures	Form (4)	x	None (0)	=	0	
		Line (3)	x	Mod. (2)	=	6	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	None (0)	=	0	
							8
		Total Score		26 (Max. of 90)			

Proposed Project	Feature	Element		Contrast		Score	
6. Storage Tanks, Troughs and Well Sites	Land Surface & Vegetation	Form (4)	x	Weak (1)	=	4	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	Weak (1)	=	1	
							10
	Structures	Form (4)	x	Mod. (2)	=	8	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Weak (1)	=	1	
							16
		Total Score		36 (Max. of 90)			
7. Roads & Trails Improvements	Land Surface	Form (4)	x	None (0)	=	0	
		Line (3)	x	Mod. (2)	=	6	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	Weak (1)	=	1	
							9
	Vegetation	Form (4)	x	Weak (1)	=	4	
		Line (3)	x	Weak (1)	=	3	
		Color (2)	x	Weak (1)	=	2	
		Texture (1)	x	Weak (1)	=	1	
							10
		Total Score		19 (Max. of 60)			
8. Vegetation	Land Surface (Short-term)	Form (4)	x	Weak (1)	=	4	
		Line (3)	x	Strong (3)	=	9	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Mod. (2)	=	2	
							19
	Land Surface (Long-term)	Form (4)	x	Weak (1)	=	4	
		Line (3)	x	Mod. (2)	=	6	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Mod. (2)	=	2	
							16
	Vegetation (Short-term)	Form (4)	x	Strong (3)	=	12	
		Line (3)	x	Strong (3)	=	9	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Mod. (2)	=	2	
							27
	Vegetation (Long-term)	Form (4)	x	Mod. (2)	=	8	
		Line (3)	x	Mod. (2)	=	6	
		Color (2)	x	Mod. (2)	=	4	
		Texture (1)	x	Mod. (2)	=	2	
							20
		Total Score		46 Short-term 36 Long-term (Max. of 60)			

Source: Calculated by BLM Specialist using Visual Resource Management Manual

APPENDIX VIII-1

SPECIFICATIONS FOR VEGETATIVE TREATMENTS NOT DESCRIBED IN THE PROPOSED ACTION

I. Spraying

A. Spraying would conform to all provisions of Federal and State pesticide laws and Executive Order 11643.

B. The BLM would specify the chemical formula to be used. No chemicals named on USDI Restricted or Prohibited Lists would be used.

C. Spraying would not be conducted during or after a rainstorm.

D. Spray would not be applied when wind velocity exceeds eight mph.

E. Sprays would be applied during the cool period of the morning or evening when air is dense and cool.

F. The types of aircraft used for spraying would be specified by BLM; aircraft would not be allowed to spray or turn within one mile of agricultural crops or residences having plants susceptible to damage from the herbicide.

G. Spray would not be applied within 100 feet (minimum) of drainages, ponds, reservoirs, streams or other bodies of permanent or temporary water.

II. Plowing

A. Plows would be Wheatland Towner Offset (or equivalent disc plows mounted on suitable wheels), or Brushland, spring-loaded disc type. Discs would be no less than 26 inches in diameter, and the gross weight per disc would not be less than 290 pounds. Maximum width of each plow would not exceed 12 feet.

B. Plowing would be done on the contour wherever possible.

C. Plowing depth would be four to six inches, except in areas where soil conditions would not permit plowing at that depth. In that case, the depth of plowing would be specified.

D. The angle of the discs and depth of plowing would be adjusted to provide the most efficient brush removal and/or soil turnover within the number of plowings required.

III. Chaining

A. Chaining would be done on the contour. (Chaining swathes could include gentle undulations and short reverse slopes of 50 yards or less where continuous contour operations are impractical.

B. Two tractors would operate as a unit with one on each end of the chain.

C. Chaining operations would not be conducted when the ground is frozen, covered with snow, or extremely wet.

D. Chain lengths, clamps, speed of tractors, tractor spacing, and overlap of swaths would be specified by BLM for each operation.

APPENDIX IX-1

NEGOTIATED PROCUREMENT - FY 76 RIO PUERCO ES AREA

Contractor	Type Information Contracted	Cost	Begin Date	Date of Final or Last Report	Remarks
1. Technology Application Center - UNM; COAR - DM	a. Vegetative Type Boundaries b. Allotment Base Maps with Improvements	$9,500	7/1/75	12/1/75 or earlier if completed	Completed 11/5/75
2. Technology Application Center - UNM; COAR - Frashier	a. Phenology - Browse b. Long-term Weather Trends c. Historical Photo Analysis d. Area Management - Areas by Vegetative Type, Allotment, Pasture, T/R, and Ownership	28,906	9/1/75	2/29/76	Completed 3/31/76
3. Gary B. Donart - NMSU; COAR - Michael	a. Grazing Capacity for Each Vegetative Type and Each Type of Grazing Treatment (eg., winter use, summer use) b. Summarize Existing Data on Vegetative Types Which Might Relate to Grazing Management and Grazing Effects	8,000	8/6/75	12/31/75	Completed 6/24/76
4. Texas Tech. University; COAR - Frashier	a. Phenology - Grasses b. Identify Seasonal Periods of Nonuse Necessary for Maintenance of Vigor for Stand Improvement of Key Species c. Provide Basis for Judging Impact of Nonuse by Livestock on Major Range Sites	20,252	9/1/75	6/30/76	Completed 6/30/76
5. Norman J. Scott - UNM; COAR - Goicoechea	a. Investigate Effects of Livestock Grazing on Populations of Non-game Animal Species Including avi-fauna, Rodents, Rabbits, Invertebrates	10,900	10/1/75	11/30/75	Completed 1/14/76

(continued)

Appendix IX-1 (continued)

Contractor	Type Information Contracted	Cost	Begin Date	Date of Final or Last Report	Remarks
6. William Martin - UNM; COAR - Michael	a. Determine Occurrence of Threatened or Endangered Plants by Field Survey b. Identify and List any Additional Threatened or Endangered Plants Encountered During Survey c. Suggest Current Status of Each Threatened or Endangered Species Encountered.	4,425	10/7/75	12/1/75	Completed 12/2/75
7. James R. Gray - NMSU (Socio-economics) COAR - Martinez (NMSO)	a. Describe existing socio-economic conditions of study area b. Describe and evaluate socio-economic impacts of proposed action and alternatives	16,420	10/1/75	5/1/76 + 2 wks. after BLM return contents Completed 6/1/76	
8. Southwest Research and Development Corp. (Air & Water Quality) COAR - Armstrong	a. Existing Climatic Conditions-Review b. Airflow and Air Quality c. Water Quality Literature Search d. Water Quality Measurement Study	14,995	11/18/75	6/30/76	Completed 12/1/76
9. U.S. Fish & Wildlife Serv. (NM State); COAR Goicoechea Memo. of Understanding	a. Black-footed Ferret Survey of Prairie Dog Towns	1,200	11/14/75	11/30/75 (Approx.)	Completed 2/18/76
10. Eastern NM Univ. (Archeology) COAR - Flynn	a. Cultural resource survey of 58 sample survey units (Approx. 58 sq. mi. total)	12,300	--------	5/31/76	Completed 5/31/76

(continued)

Appendix IX-1 (continued)

Contractor	Type Information Contracted	Cost	Begin Date	Date of Final or Last Report	Remarks
11. UNM-Dept. of Anthropology (Paleontology) COAR - Sparks	a. Assess available paleontological information b. Assess probable effects of grazing on the resources c. Assessment will be accomplished through literature research and field work	5,540.29	3/2/76	4/2/76	Completed 4/7/76
12. NM Game & Fish COAR - Goicoechea	a. Inventory of Game Species Present in Area	None (Cooperative) (Work)	10/8/75	11/30/75 (Approx.)	Informal Presentation of Information
13. Soil Conservation Serv. COAR - Saladen (NMSO)	a. Basic Soil Survey Data on Approximately 40% of the Area	38,268.75	10/1/76	9/30/77	Field Work Completed 4/30/77
14. Koogle & Poule Albuquerque	a. Complete Aerial Photography of Rio Puerco	1,275	7/10/75	8/25/75	Completed 8/4/75

APPENDIX IX-2

STATE OF NEW MEXICO

STATE PLANNING OFFICE

GREER BUILDING
505 DON GASPER
SANTA FE, 87503
(505) 827-2073

GRACIELA (GRACE) OLIVAREZ
STATE PLANNING OFFICER

JERRY APODACA
GOVERNOR

BLM
ALBUQUERQUE
OCT 01 1976
ACTION

Rmce
RP✓

X = ACTION
✓ = INFO.

September 27, 1976

Mr. Donnie Sparks
Rio Puerco Area Manager
Bureau of Land Management
P. O. Box 1449
Santa Fe, New Mexico 87501

Dear Mr. Sparks:

This is with reference to the Rio Puerco Grazing Environmental Statement, which was sent to me for review by the State Office of the Bureau of Land Management recently.

The review required would take the form of a determination of the eligibility to the National Register of Historic Places of 508 archeological sites on 57 sections of land in a total area of about 365,000 acres. I have several comments to make about the utility and advisability of dealing with the Statement in this way.

The specifications for the protection of cultural resources are, in my opinion, adequate to direct determinations of effect once specific projects have been designed. However, the question of effect cannot be adequately dealt with until the exact nature of the land modification is known. The question of significance or eligibility, furthermore, depends on the state of knowledge at the time of the land-modifying project. A site which is important now may not be so years from now, if its research potential has been realized by the excavation of another, related site. Conversely, a site which appears unimportant now may be seen to be important years from now, in connection with a wider investigation.

The answer to this situation, as I see it, is that the significance of a site can only be assessed in the framework of a cultural resource management plan, area-wide, based on the present state of scientific knowledge and on the general idea of the conservation of cultural resources, and to be updated at suitable intervals. A grazing ES is not in my opinion adequate for this purpose. Cultural resource management has its own rationale, apart from any land-modifying undertaking.

From what I know about the standard procedures of the Bureau of Land Management, I think that the proper place to handle these questions is in the Unit Resource Analysis/ Management Framework Plan process. The appropriate Bureau people should be asked to draw up URA's and MFP's for cultural resources area-wide. I could review these in consultation with Bureau cultural resource specialists; they would then be embodied as agreements between the State Director and Area Director, and be subject to period update.

I would be obliged if you would refer this idea to the appropriate people at the State level. I will expect to receive their opinion as to whether we can put it into practice. I want to reiterate that in my opinion the specifications for protection of cultural resources as set forth in the ES are adequate contingent on periodic review of the question of area-wide significance.

Sincerely,

Thomas W Merlan

Thomas W. Merlan
State Historic
Preservation Officer

TWM*liz

Glossary

Adverse Visual Impact. Any impact on the vegetation, land form, or any introduction of a structure which interrupts or adversely changes the visual character of the landscape and disrupts the harmony of the natural elements.

Aggregates (Soil). Combinations of primary soil particles that have formed secondary particles or units.

Alkaline soil. A soil that has a pH value greater than 7.0, particularly above 7.3, throughout most or all of the root zone, although the term is commonly applied only to the surface layer or horizon of the soil.

Alkaline. Having the properties of an alkali; opposite of acid, pH above 7.0.

Allotment. An area of land where one or more individuals graze their livestock. It includes public lands and may include parcels of private or state lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of several pastures or may be only one pasture.

Allotment Management Plans (AMP). A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific management goals in an allotment.

Alluvium. Materials transported and redeposited by water. (2 groups) (1) Local alluvium, like that found at the base of slopes, along small streams flowing from small drainage basins of nearly homogeneous rock and soil material, and (2) general alluvium of mixed origin, as along major stream courses.

Animal Unit (AU). Livestock numbers.

Animal Unit Month (AUM). The amount of forage required to sustain the equivalent of one cow, one horse, one elk, five sheep, five goats, five deer or five antelope for one month.

Annuals. Plants produced from seed which complete their life cycle in one growing season.

Apical Meristem (Plants). The apex or terminal bud where cell division for growth is carried on by cells specialized for that purpose.

Archaic (Cultural Resources). Relating to, belonging to, or having the characteristics of an earlier, or often more primitive time.

Artesian. Involving, related to, or supplied by the upward movement of water under hydrostatic pressure in rocks or unconsolidated material beneath the earth's surface.

Artificial Regeneration. The establishment of new plants through the direct efforts of man such as seeding or planting.

Aspect (Vegetative). The appearance that a dominant or most common species of vegetation gives to the viewer, i.e., shortgrass, pinyon-juniper, big sagebrush, see vegetative type.

Aquifer. A water-bearing bed or stratum of permeable rock, sand, or gravel capable of yielding considerable quantities of water.

Bare Ground. Exposed ground surface.

Barren. A vegetative sub-type which has little or no vegetation present.

Basalt. A dark-gray to black dense to fine grained igneous rock that consists of basic plagioclase augite; and usually magnetite with olivine for basalt glass.

Base Camp Habitation. Permanent or recurring habitation sites including campsites, pit houses on surface structures depending upon the technological development of the cultural group.

Basic Elements. The four major elements (form, line, color, and texture) which determine how the character of a landscape is perceived.

Basketmaker. Any of three stages of an ancient culture of the plateau area of Southwestern U.S. that preceded and formed one cultural development with the Pueblo which was characterized by excellent basketry.

Bedrock. The solid rock underlying the soil and other unconsolidated materials or appearing at the surface where these are absent.

Bentonite. A clay formed by the decomposition of volcanic ash, having the ability to absorb large quantities of water and to expand to several times its normal volume.

Biotype. All the organisms sharing a specified similarity, such as all the species of one genus.

Broadcast Seeding. A method of seeding which spreads seed over the ground surface. Seeding can be done by hand or machine. Adapted to rough or rocky terrain.

Browse. As a verb, to consume, or feed or eat on (a plant); as a noun, the tender shoots, twigs, and leaves of trees and shrubs often used as food by cattle, deer, elk, and other animals.

Browser. An animal that feeds on the twigs, buds, fruit, or seeds of woody plants.

Brushcutting. Brush control by use of a machine which cuts brush. See Rotory and Marden brushcutting.

Burns. Refers to an area which has had a wildfire, a burned over area.

Catchment. A structure built to collect and retain water.

Catchment Area. The area draining into a catchment.

Chaining. A method of brush and tree control done by pulling a heavy ship anchor chain between two crawler tractors. Woody species are uprooted or pulled out of the ground.

Changing Season of Use. Adjusting the time of livestock grazing on a range area based on type of vegetation or stage of vegetation growth.

Chemical Control (Vegetation). Utilization of chemicals to control dominant or undesirable species in order to reduce competition with native or previously seeded, desirable species.

Class I. Library, archival, and literature research with consultation to identify known cultural resources.

Class II. A field inventory of cultural resources of an area systematically designed to provide a predictive model of the nature and distribution of the cultural resources in the entire area.

Class III. An intensive field search of all surface evident cultural resources for an entire area.

Class of Livestock. Kinds of domestic livestock grazing on a range; cattle, horses, sheep or goats, or a combination of these. May be broken down to greater detail such as cows with calves, yearlings, steers, ewes, ewes with lambs, etc.

Clay. A mineral soil separate consisting of particles less than 0.002 mm in equivalent diameter.

Clearcuts. A system of logging practice by which all marketable trees are removed.

Coliform. A group of bacteria used as an indicator of sanitary quality in water. The total coliform group is an indicator or sanitary significance because the organisms are normally present in large numbers in the intestinal tracts of humans and other warm-blooded animals.

Colluvium. Poorly sorted material at the base of strong slopes that have been moved by gravity, frost action, soil creep, or local wash.

Color. The property of reflecting light of a particular wave length that enables the eye to differentiate otherwise unidentifiable objects.

Continental Climate. The climate of areas where temperature extremes are wide because of lack of oceanic influence. Commonly occurring in the interior of large continents.

Contrast. The effect of a striking difference in the form, line, color, or texture of an area being viewed.

Contrast Rating. A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature.

Convectional Thunderstorms. Storms that occur when the land surface becomes very hot under strong insolation and the lower strata of the atmosphere, in turn, heated considerably. Cumulus clouds are the upper ends of columns of overturned air formed by warm air projected upward to altitudes where it is chilled to the point of condensation. This phenomenon results in rains of high intensity, short duration and local distribution, usually accompanied by lightning (R. F. Daubenmire).

Cool-Season Grass. A plant which makes the major portion of its growth during late winter, early spring, and again in the fall (during the cool seasons).

Cooperative Agreements. An agreement issued by BLM in conjunction with the construction of a project on public lands: both the licensee and BLM have an interest in the project with the government retaining ownership of the project. This agreement also spells out who will maintain the project. The project must be built to BLM specifications.

Cretaceous. Of, or relating to the last period of the Mesozoic era and the corresponding system of rocks, the deposits of the period including the larger part of the known chalk beds, greensand marl, and most U.S. coal west of the Great Plains.

Critical Wildlife Habitat. That portion of the living area of a wildlife species that is essential to the survival and perpetuation of the species either as individuals or as a population.

Crossing Permit. A permit issued to trail livestock across public lands.

Crown. The space occupied by a plant when viewed from overhead.

Cuesta. A sloping plain, especially one with the upper end at the crest of a cliff; a hill or ridge with one face steep and the opposite face gently sloping. Common in Southwestern U.S.

Cyclonic or Frontal Storms. Storms that are caused by eddies of warm air several hundred miles in diameter; rising in vertical spirals about centers of low atmospheric pressure. As the ascending mass of air in a cyclone rises, it expands, mingles with cold air and thereby, is greatly cooled. Precipitation results from this action and storms of this type are usually of long duration.

Decreaser. A plant species of the original vegetation that will decrease in relative abundance with continued overuse.

Deferred-Rotation Grazing. A system of grazing which delays grazing in succeeding years on a portion of the range until a specific plant growth stage is reached. The entire range is used at sometime during the grazing season.

Dendritic. This is a stream erosional pattern. Erosion in the steep headwater tributaries both deepen the valley and extend the pattern. Underlying rock offers uniform resistance to weathering and erosion, tributaries thus sub-divide headward like the limbs of a tree, with a main trunk-like stream and limb-like tributaries.

Desirable Plants. Plants which are palatable and productive forage species, often are dominant under or near climax conditions, are long lived, and have deep fibrous roots to protect the watershed against erosion. This category includes the important key species (grasses, forbs, and browse) which are to be maintained or increased by intensive livestock management.

Dike. A tabular body of igneous rock that has been injected into a fissure while molten.

Easement(s). A non-profitable interest granted by deed or created by will, deed, or prescription that is held by one person in land owned by another and that entitles its holder to a specific limited use or enjoyment (as the right to cross the land or to have a view continue unobstructed over it).

Ecosystem. A community, including all the component organisms, together with the environment, forming an interacting system.

Ecotone. A transition area between two adjacent ecological communities.

Effective Root Depth. Depth to which the major portion of roots of the most common forage species penetrate the soil.

Endangered or Threatened Status. Determined for plants and animals by any one or a combination of the following factors:
1. The present or threatened destruction, modification, or curtailment of its habitat or range.
2. Overutilization for commercial, sporting, scientific or educational purposes.
3. Disease or predation.
4. The inadequacy of existing regulatory mechanisms; or,
5. Other natural or man-made factors affecting its continued existence.

Endangered Populations (EnP). Wide ranging taxa of low population frequency and density. Populations within the Rio Puerco ES Area are considered endangered.

Endangered Taxa (En). Taxa with very restricted ranges, low population frequencies, and low densitites (uncommon). Improper land use practices and/or topographical disturbances could cause extinction of the taxa.

Environment. The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and, ultimately, determine its form and survival.

Eolian. Soil materials or deposits which have been transported by wind action.

Erodibility. The relative ease with which one soil erodes under specified conditions as compared with other soils under the same conditions; this applies to both sheet and gully erosion.

Erosion. The wearing away of land surface by wind, running water, and other geological agents.

Erosion Condition Classes. A classification system for soil erosion which allows a site to be ranked on a scale of 0-100, in increments of 20 points. Value classes are: 0-20= stable; 21-40= slight; 41-60= moderate; 61-80= critical; 81-100= severe. The terms used for value classes are largely self-explanatory.

Fair Range Condition. Composition is 15-39 percent of desirable and intermediate species with five percent or more made up of desirable species. SSF is less than 60. (Also, those ecosystems where the composition comprises 60 percent or more of intermediate species and less than five percent, desirable species are present will be rated ""Fair condition'' when the SSF is less than 60.

Flocculation. Process by which suspended colloidal or very fine particles are assembled into larger masses of floccules.

Forage (Competitive). Plants which are used as food by large herbivores such as cattle and large and small wildlife.

Forage (Non-competitive). Plants which have no food value but are useful for watershed protection, cover for wildlife, etc.

Forage Acre. The number of acres in a specific area (such as a pasture or an allotment) that is completely covered by forage.

Forage Acre Requirement (FAR). The number or fraction of forage acres necessary to support and maintain an animal for a specified period of time.

Forb. Herbaceous plants other than grass, such as clover.

Form. The mass of an object or objects that appear unified.

Frost-heave. The raising of a surface due to the accumulation of ice in the underlying soil.

Future Erosion Condition Classes. Indicate the erosion activity under different types of management, generally after 15 years.

Gallina. Of, or relating to an ancient culture in New Mexico, contemporaneous with Anasazi and characterized by unpainted pottery, resembling of Shoshoni utility types, painted pottery similar to Anasazi types, and leaf-shaped stone blades having a notch on each side halfway between the point and the base.

Good Range Condition. Composition is 40 percent or more of both desirable and intermediate species with at least 20 percent made up of desirable species. SSF is less than 40.

Grazer. An animal that feeds on grasses and other herbaceous vegetation.

Grazing District. An administrative subdivision of the rangelands under the jurisdiction of the Bureau of Land Management, established pursuant to the Taylor Grazing Act of June 28, 1934. Section 3 lands are those public lands within a grazing district boundary pursuant to Section 3 of the Act.

Grazing System. A systematic sequence of grazing use and nonuse of an allotment to reach identified multiple use goals or objectives by improving the quality and quantity of the vegetation.

Ground Cover (Soil) (Hydrologic). All material which covers the ground surface; includes live vegetation, dead vegetative material (litter) small and large rock.

Ground Cover (Vegetation). Vegetative ground cover is living vegetation which covers a point on the ground surface, when viewed from directly overhead, including canopies of trees and shrubs within 20 feet or less of the ground surface and lichens and mosses 1/16 inch or more in thickness.

Gully Erosion. Removal of soil whereby the formation of relatively large channels or gullies cut into the soil by concentrations of runoff.

Hedged Condition. (Vegetation) The appearance of shrub plants which have been grazed to the extent that plants resemble a trimmed hedge.

Herbivore. A plant-eating animal.

High Risk Tree. Tree which, due to age, damage or location, is not putting on any net growth, or, is expected to die within the next 20 years.

Homegeneous. Having uniform structure and composition, as soil material deposited by water.

Humates. A salt or ester of a humic acid (any of the various organic acids obtained from humus).

Humus. Accumulated debris of plant stems, leaves, and roots forming the organic material in soils.

Hunters and Gatherers. A group of people (organized into a distinct social unit) that subsists by the collection and consumption of wild plants and animals.

Igneous Rock. Rock formed by solidification of molten magma.

Impervious (Soils). Prohibits fluid flow.

Impotable. Not suitable for drinking.

Increasers. Plants which increase as the vegetational composition deteriorates.

Infiltration. Water entering the groundwater system through the land surface.

Intermediate Plants. Plants of secondary importance in the climax condition. They replace the desirable plants, as condition deteriorates, and replace the least desirables as condition improves. They may be less desirable to grazing animals or be more resistant to grazing use.

Internal Soil Drainage. The downward movement of water through the soil profile. The rate of movement is determined by the texture, structure and other characteristics of the surface soil and subsoil. Relative terms of expressing internal drainage are none, very slow, slow, medium, rapid, and very rapid.

Intrusion. Feature (land, vegetation, or structure) which is generally considered out of context with the characteristic landscape.

Invaders. Plants which invade or occupy open space resulting from the loss of other longer lived plants.

Inversion (Temperature). A reversal of normal atmospheric temperature gradient, increase of temperature of the air with increasing altitude.

Key Forage Species. Relatively or potentially abundant, endures moderately close grazing, and serves as an indicator of changes occurring in the vegetational complex. This species is an important vegetative component that, if overused, will have significant effect on watershed condition, grazing capacity, or other resource values. Other forage species having growth requirement equal to or less than the lay species will be maintained by the rest.

Lagomorph. An animal of the order Lagomorpha represented by hares, rabbits, and pikas. They resemble rodents and were formerly classified as such, but were separated from rodents on the basis of dental characteristics.

Land Use Projects. Range improvement projects such as those shown in Chapter I.

Landscape Character. The arrangement of a particular landscape as formed by the variety and intensity of the four basic elements of form, line, color, and texture.

Leaching. The removal of materials in solution from the soil.

Least Desirable Plants. Plants that are definitely the poorer species in a type or community, and consist principally of invaders, noxious, or low value forage plants.

Lenses. Pertains to pockets of sand, as found in unconsolidated alluvium, where stratification has occurred by deposition of streams. Composition varies in texture and is subject to frequent changes by stream overflow.

License. An authorization which permits the grazing of a specified number and class of livestock on a designated area of grazing district lands for a period of time, usually, not in excess of one year.

Line. A point that has been extended. It may be anything that is arranged in a row or sequence.

Litter. Dead vegetation.

Livestock Facilitating Projects. Projects used specifically in the grazing management of livestock.

Livestock Operation. The management of an area of land so that a significant portion of the income is derived from the continuing production of livestock.

Magnitude of Contrast. A classification of intrusions as to the degree which they have modified or intruded upon the natural landscape.

Management Framework Plan (MFP). Land use plan for public lands which provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

Manipulation (Vegetative). Any technique (chaining, plowing, seeding, etc.) which is designed to control a dominant undesirable species or establish a desirable species of vegetation.

Marden Brushcutting. The Marden brushcutter is a machine consisting of two heavy cylinders which have blades attached to the outside surface and parallel to the axis of the cylinder. The cylinders are filled with liquid for added weight and are attached to a frame which places them in tandem, one behind the other. As the machine is pulled the cylinders roll forward and the brush is both crushed to the ground and cut by the blades. Adapted for use on only those species which do not resprout from the crown or roots.

Marginal. Tree, that when harvested, yields no profit or loss. These trees are generally near the dividing area between productive forest lands and non-productive forest lands.

Mesa. An isolated hill or mountain having abrupt or steeply sloping sides and a level top that is composed of a resistant nearly horizonatal stratum of rock.

Microclimate. The local climate of a given site or habitat of variable size.

Multiple Use. Harmonious and coordinated management of the various surface and subsurface resources, without impairment of the land, that will best meet the present future needs of the people.

National Register. The National Register of Historic Places, which is a register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology and culture maintained by the Secretary of the Interior.

National Register Property. Means a district, site, building structure or object included in the National Register.

Natural Regeneration. The establishment of new plants without the direct efforts of man.

Naturalistic Character. A landscape situation where the basic elements are displayed in a composition that appears natural within the surrounding area or character type.

Non-Productive Forest Lands (NPFL). Forested lands not capable of producing 20 cubic feet of wood volume per acre per year.

Non-Ranch Income. Earnings in non-ranch businesses.

Obsidian hydration. A method of dating obsidian artifacts by measuring the penetration of water into the obsidian. The degree of penetration is proportional to the time elapsed since the artifact was made.

Off-Road Vehicle (ORV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

Other Ranch Income. Income from custom work.

Overgrazing. Consumption of vegetation by herbivores beyond the endurance of a plant to survive.

Overstocking. A condition in which an area is occupied by more than the optimum number of livestock (wildlife, trees, etc.).

Overthrust (Fault). A reverse fault in which the angle between the horizontal and the plane is small.

Pace Point Transects. A method of estimating the vegetative ground cover which occurs on a predetermined transect line. A notch 1/8 inch wide and 1/16 inch deep is made on the sole of the toe of the boot. As that toe touches the ground, whatever is under or above the notch is recorded, i.e., live vegetation (species), litter (dead vegetative material) rock and bare ground.

Paleo-Indian. Cultural remains of human groups which coexisted with Pleistocene megafauna in North America.

Parent Material. The unconsolidated mass of rock material from which the soil profile develops.

Pasture. As used in this document, a pasture is a subdivision of a grazing allotment on public lands.

Percolation. Downward movement of water through soils.

Perennials. Plants which may live a few to many years.

Permeability. The measure of the capacity for transmitting a fluid through the substance.

Permian. Of, or relating to, the last major division of the Paleozoic marked by extensive glaciation in India, South Africa, South America and Australia by decline of the amphibians and increase of primitive reptiles and by rocks consisting largely of red sandstone and shale.

Perquisites. Ranch products produced and consumed by farm families.

Phenology. A term used to describe the sequence of events and time of occurrence of the life processes of a plant, i.e., start of growth, bloom stage, seed ripe stage, dormant stage.

Physiography. The description and genetic interpretation of the relief features of the earth's surface.

Physiological Needs of Plants. Requirements of vegetation to survive, the need to manufacture food, to replenish food reserves, to produce viable seed, and to have new seedlings become established.

Piping. The formation of underground channels that result in gullies and sinkholes.

Plant Density. The number of vegetation individuals per unit of area. Refers to the relative closeness of individual vegetation to one another.

Plant Growth Requirements. Similar to physiological needs of plants but more specific; pertains to requirements of soil for rooting, water, minerals, light, and air.

Plant Vigor. The relative well being and health of a plant as reflected by its ability to manufacture sufficient food for growth and maintenance.

Pond. Artifically enclosed body of water; a body of standing water smaller than a lake, often artificially formed.

Poor Range Condition. Composition less than fifteen percent desirable and intermediate species. SSF is more than 60. Plant lists are prepared for each BLM District classifying plants as desirable, intermediate, and least desirable for each class of livestock (cattle, sheep, horses, and burros).

Predator. An animal that preys on one or more other animals.

Prehistoric Horticulture Groups. A group of people who practiced horticulture in the past, and of whom there is no written record.

Productive Forest Land (PFL). Forested lands which have the capability to produce at least 20 cubic feet of wood volume per acre per year.

Proper Use Factor (PUF). Represents the average weight percentage of a particular plant species, in relation to all other species, that can be safely grazed without restricting forage capacity production.

Public Lands. Lands administered by the Bureau of Land Management.

Pueblo. Of, or relating to, a culture of the plateau area of the Southwestern U.S.

Ranch Sales. Market value of the products sold, at the farm or ranch level.

Ranch Unit. Ranch area used by a family to earn a living (maybe all in one piece or several pieces).

Range Condition and Trend. A description of the current status and estimated future improvement or deterioration of the vegetation and soil.

Range Conservationist. A person trained in the use and management of natural resources in accordance with principles that assure a sustained yield of renewable benefits and values without impairment of environmental quality.

Range Improvement. A structure, action, or practice that increases forage production, improves watershed and range condition, or facilitates management of the range of the livestock grazing thereon.

Range Improvement Fund. Part of the grazing fees set aside for the construction and maintenance of range improvement projects.

Reaction (Soil). The degree of acidity or alkalinity of a soil expressed in pH values. A soil that has a pH of 7.0 is neutral in reaction; acidic reactions are below pH 7.0, alkaline recreations are above pH 7.0.

Reservoir. An artificial lake or pond in which water is collected and stored for range management uses.

Rest. As used in this statement, refers to deferment of grazing on a range area to allow plants to replenish their food reserves.

Rest Rotation Grazing. A system which rests the range from grazing at suitable intervals to counteract the harmful effects of selective grazing. The system allows the desirable forage species to recover vigor, produce seed, and reproduce.

Restricted Range (RR). Taxa that exists primarily in the Four Corners area having moderate population frequencies and densities. (Martin et al., 1975).

Rill Erosion. Removal of soil through the cutting of numerous small, but conspicuous water channels that are minor concentrations of runoff.

Ripping. A method of watershed tillage whereby an implement makes a narrow deep opening in the soil profile. The rips are made on contour lines and intercept the surface flow of water and allow increased storage of water in the soil. The technique reduces flood and erosion damages.

Rock, large. Rock larger than two inches in diameter.

Rock, small. Rock less than two inches in diameter.

Rock Art. Pictoral representations of symbols, figures, and other cultural meaningful shapes on rock surfaces. The representations can be engraved, ground, pecked, or painted on the rock.

Rotary Brushcutting. A method of brush control done with a machine which has a powered, spinning blade that is parallel to the ground surface. The action is similar to that used by many lawn mowers, except the machine is much larger and is powered by a tractor. Adapted for use on only those species which do not resprout from the crown or roots.

Rotation. A grazing system providing for sequential movement of livestock from one pasture to another on the basis of allowing for regrowth of vegetation and maintenance of vegetative vigor.

S1 (Cultural Resources). In general, S1 properties show a clear potential for yielding, or having yielded, highly significant scientific/educational information and are clearly important in terms of national, state, or local cultural events. Normally, the S1 rating will be assigned to those properties which are in relatively good condition and are unique or representative and/or have important associations.

S2 (Cultural Resources). S2 properties are usually not particularly unique, representative, nor do they have important associations. The condition of the property usually is only fair. These kinds of properties are often large but do not have great antiquity and only limited depth potential and many abandoned aboriginal camps and villages. Abandoned western homesteads, small mining camps, cemeteries, railbeds, roads, and trails will generally be S2. Contemporary properties may become highly significant from standpoints of national, state, or local history and culture but they cannot be clearly and immediately assessed as such.

S3 (Cultural Resources). S3 properties have the potential for contributing data in regards to solving regional problems, such as reconstruction of paleo-environments and patterns of human use of a region. These kinds of properties usually show little (if any) depth, nor very few features, may have great antiquity but be very small in size, or may be very large in size but show no great concentration of materials. Examples include seasonable aboriginal camps, hunting and gathering activity areas, isolated finds, dumps, isolated domestic and non-domestic buildings and materials, small mining operations, will often fall here.

S4 (Cultural Resources). The S4 rating is only assigned to properties that have minimal information retrieval possibilities.

Saline. Indicates the presence of one of several metallic salts, generally potassium, sodium or magnesium compounds, which may occur in soils.

Saline Soil. A non-sodic soil containing sufficient soluble salts to impair its productivity but not containing excessive exchangable sodium. (This name was formerly applied to any soil containing sufficient soluble salts to interfere with plant growth).

Sandstone. A sedimentary rock made up of sand which usually consists of quartz more or less firmly united by some cement (as silica, iron oxide, or calcium carbonate) and that varies in color, being commonly red, yellow, brown, gray, or white.

Scenic Quality. The quality of the scenery as determined through the use of the scenic evaluation process.

Section 4 Permit. A permit issued by BLM for the licensee to construct a project on public lands. The project must be built to BLM specifications. The licensee has the sole interest in the project on public lands, including maintenance.

Sedimentary Rock. Rock formed of mechanical, chemical, or organic sediment.

Semi-arid. Characterized by light rainfall and high evaporation, the growth of short grasses, and dry farming of limited yield; having from 10 to 20 inches of annual precipitation.

Sensitivity Level(s). An index of the relative importance or value of visual response to an area in relation to other areas in the planning unit.

Shale. A fissile rock that is formed by the consolidation of clay, mud, or silt; has a finely stratified or laminated structure parallel to the bedding and is composed of minerals that have been essentially unaltered since deposition.

Sheet Erosion. More or less uniform removal of soil from an area without the development of conspicuous water channels.

Shortgrass. Sub-division of the temperate grassland biome which is classed by the height of the above ground parts.

Silt. Sedimentary material consisting primarily of mineral particles intermediate in size between sand and clay.

Site Index. A measure of forest productivity of an area using the average height of the dominant trees at 50 years of age as a measuring device.

Slough. To become shed or cast off.

Soil. (i) The unconsolidated mineral material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (ii) The unconsolidated mineral matter of the surface of the earth that has been influenced by genetic and environmental factors including parent material, climate, topography, all acting over a period of time and producing soil that differs from the parent material in physical, chemical, biological, and morphological properties and characteristics.

Soil Associations. (i) A group of defined and named taxonomic soil units occurring together in an individual and characteristic pattern over a geographic region, comparable to plant associations in many ways. (ii) A soil mapping unit in which two or more defined taxonomic units occurring together in a characteristic pattern are combined because of map scale or intermixing of taxonomic units.

Soil Depth.

	Lower Boundary Inches
Very Shallow	12
Shallow	12-20
Moderately Deep	20-36
Deep	36-40
Very Deep	40
	60

Soil Series. A group of soils having genetic horizons that, except for texture of the surface layer, have similar characteristics and arrangement in the profile.

Soil Texture. The relative proportions of the various soil separates, sand, silt and clay.

Sonoran. Relating to, or being the arid division of the biographic zone that includes the warmer parts of the Western U.S. and Central Mexico.

Spring. A flow of water from the ground, the source of a stream.

SSF. The abbreviation for Soil Surface Factor. The SSF, as computed through the use of BLM Form 7310-12, is an expression of current erosion activity. Seven categories of surface features are considered by the field man in the examination of the area represented by a Transect. Both wind and water are considered for each category. The categories are: soil movement, surface litter, surface rock, pedestalling, rills, flow patterns, and gullies. Numerical values are assigned to each category and are totaled to determine the SSF. The value of the SSF determines the erosion condition class of the Transect area. Also, see erosion condition.

Stock Pond. An artifically enclosed body of standing water smaller than a lake, used by livestock and wildlife.

Storm.

2 Year Storm. Volume and intensity of a storm that could be expected to happen once in 2 years.

10 Year Storm. Volume and intensity of a storm that could be expected to happen once in 10 years.

50 Year Storm. Volume and intensity of a storm that could be expected to happen once in 50 years.

Stratification (Vegetative). A pattern of arrangement of vegetation in vertical layering, as by height. Examples are: grass, shrubs, pinyon-juniper, ponderosa pine.

Subsistence - Resource Loci. Areas of subsistence and other resource extraction or processing activities.

Subsoil. (i) That which is laid or spread under; an underlying layer, such as substrata. (ii) The substance, base, or nutrient on which an organism grows.

Suspended Non-Use. The difference between the grazing privileges and the present allowable stocking rate of the public lands.

Sweat Lodges. A hut, lodge, or cavern heated by steam from water poured on hot stones and used especially by American Indians for ritual or therapeutic sweating.

Talus Slopes. Slopes formed by the accumulation of rock debris.

Target Species (In Vegetative Treatment). In plant control, the species for which the project is designed to reduce or control.

Taxa. The systematic arrangement of similar plants in classes or categories, in this case, plants identified in the categories of Family, Genus, Species, and Variety.

Tertiary. Of or relating to the time interval between the close of the Mesozoic era and the beginning of the Quaternary period during which the Alps, Caucasus, Himalayas and other high mountains were formed; the Cordilleran system from Alaska to Cape Horn was developing, and the dominant land form was mammalian.

Texture (Soils). The relative proportions of various soil separates, sand, silt and clay.

Thermo-Luminescence. Phosphorescence developed in a previously excited substance (as quartz) upon gentle heating.

Threatened Taxa (Th). Taxa with restricted ranges, moderate population frequencies and, generally, low densitites. Improper land use practices and/or topographical disturbances could change the taxa to endangered.

Tilth. The physical condition of soil as related to its ease of tillage, fitness as a seedbed, and its facilitation of seedling emergence and root penetration.

Total Vegetation. See Vegetation, Total

Treatment (Vegetative). The technique of plant control or watershed tillage which is used to change or improve vegetative ground cover and composition to desirable species.

Trough. A long, narrow, open container for holding water for animals; can be built of galvanized steel, or poured in concrete, and may be a round container.

Turnover Rate. The rate at which a population of animals or plants is replaced by new individuals.

2, 4-D (Dichlorophenoxyacetic Acid). A selective chemical agent which is used to eradicate certain broad leaf plants. In this case, the target plant would be sagebrush.

Understocking. A condition in which an area is occupied by less than the optimum number of trees.

Ungulate. A hoofed animal.

Utilization. The proportion of current year's forage production that is consumed or destroyed by grazing animals. Usually expressed as percentage.

Variety (Visual Resources). The state or quality of being varied and having the absence of monotony or sameness.

Vegetative Composition. Percentage of vegetation occupied by each species.

Vegetation, Total. Amount of ground surface covered by live vegetation.

Vegetative Sub-type. A sub-division of a vegetative type which generally indicates an aspect to the viewer of either a single dominant species, or dominant species, similar in appearance (i.e., vegetative type = Conifer; vegetative sub-type = ponderosa pine: vegetative type = Grass; vegetative sub-types = shortgrass, tallgrass, etc.).

Vegetative Type. A term used to differentiate vegetation. It generally refers to the species or various combinations of species which have similar stature, morphology, and appearance and dominate or appear to dominate a site, giving it a common appearance.

Vigor (Plants). The state of health of a plant. The capacity of a plant to respond to growing conditions, to make and store food, produce food, produce seed, or reproduce vegetatively, that is, by stolons or rhizomes.

Visual Management Unit. An area of land where there is no variation in the visual zone, sensitivity zone, and scenic quality zone.

Visual Resource. The land, water, vegetative, animal, and other features that are visible on all public lands.

Visual Resource Management Class. The degree of alteration that is acceptable within the characteristic landscape. It is based upon the physical and sociological characteristics of any given homogeneous area.

Visual Zones. The area that can be seen as foreground, middleground, background, or seldom seen.

Volcanic Plug. The solidified material (basalt) filling a vent or pipe of a dead volcano.

Warm Season Grass. A plant which makes most, or all of its growth during the spring, summer or fall and is usually dormant in winter; grows during the warm seasons.

Water Intake. Capacity and capability of soil to take water into the profile.

Well. A deep hole or shaft sunk into the earth to tap an underground supply of water, gas, oil, etc.

Wildings. Native tree (pinyon) that is dug and replanted for domestic landscaping.

References

Adams, Eleanor B. and Fray Angelico Chavez. 1956. The Missions of New Mexico, 1776: A Description by Fray Francisco Ananasio Dominguez. University of New Mexico. Albuquerque.

Aldon, Earl F. and George Garcia. 1973. Seventeen Year Sediment Production from a Semi-Arid Watershed in the Southwest. U.S. Forest Service Research Note RM-248. Rocky Mountain Forest and Range Experiment Station. Fort Collins.

Allen, D. L. 1974. Wildlife Legacy. Funk and Wagnalls. New York.

Andrews, R. M.; D. C. Coleman; J. E. Ellis; and J. S. Singh. 1974. "Energy Flow Relationship in a Shortgrass Prairie Ecosystem," Proceedings of the First International Congress of Ecology. Centre of Agricultural Publishing and Documentation. Wageningen, The Netherlands.

Avant, J. 1956. Climatological Summary of New Mexico, Technical Report No. 5, 2 Vols. State of New Mexico.

Bailey, Vernon. 1971. Mammals of the Southwestern United States with Special Reference to New Mexico. Dover Publications. New York.

Balda, R. P. 1975. "Vegetation Structure and Breeding Bird Diversity," The Symposium on Management of Forest and Range Habitats for Non-Game Birds. Tucson.

Baltz, E. H. and S. W. West. 1967. Groundwater Resources of the Southern Part of Jicarilla Apache Reservation and Adjacent Area. U. S. Geological Survey Water Supply Paper 1576-H.

Barkley, William A. 1976. Water Quality Field Survey, Rio Puerco Grazing Area. Final Report, BLM Contract No. YA-512-CT6-73. Southwest Research and Development Company, Las Cruces.

Bell, M. M. and G. H. Studinski. 1972. Habitat Manipulation and Its Relationship to Avian and Small Rodent Populations on the Descanso District of the Cleveland National Forest. U. S. Department of Agriculture - Forest Service.

Berghofer, Louis. 1967. "Predators," New Mexico Wildlife Management. State of New Mexico Department of Game and Fish. Santa Fe.

Borror, Donald J., and Richard E. White. 1970. A Field Guide to the Insects. Houghton Mifflin Co. Boston.

Boyd, Richard J. 1970. Elk of the White River Plateau, Colorado. Colorado Division of Game, Fish and Parks. Denver.

Brugge, David M. 1964. "Big Bead Mesa," Navajo Times. Window Rock, Arizona.

Bryan, Kirk. (undated). "Historic Evidence on Changes in the Channel of the Rio Puerco, A Tributary of the Rio Grande in New Mexico."

Bureau of Business and Economic Research. 1972. "A Note on Population Projections," New Mexico Business. Vol. 25. University of New Mexico. Albuquerque.

Bureau of Business and Economic Research. 1974. Business Establishments by Size and Type in New Mexico. Business Information Services No. 51. Institute for Social Research and Development. University of New Mexico. Albuquerque.

Bureau of Business and Economic Research. 1975. New Mexico Statistical Abstract. University of New Mexico. Albuquerque.

Burkham, D. E. 1966. Hydrology of Cornfield Wash Area and Effects of Land-Treatment Practices, Sandoval County, New Mexico, 1951-60. U. S. Geological Survey Water Supply Paper 1831. U. S. Government Printing Office, Washington, D. C.

Burt, William Henry and Richard Philip Grossenheider. 1964. A Field Guide to the Mammals. Houghton Mifflin Co. Boston.

Calkins, Hugh G. 1937. "A Report on the Cuba Valley," Regional Bulletin No. 36. Region Eight, Soil Conservation Service. Albuquerque.

Campbell, Howard. 1967. "Quail," New Mexico Wildlife Management. State of New Mexico Department of Game and Fish. Santa Fe.

Campbell, Howard; Donald K. Martin; Paul E. Ferkovich; and Bruce K. Harris. 1973. "Effects of Hunting and Some Other Environmental Factors on Scaled Quail," Wildlife Monograph No. 34. The Wildlife Society. Washington.

Capener, William and Earl F. Forenson. 1970. Water Requirements for Livestock in New Mexico in 1980, 2000, 2020. Agricultural Experiment Station. New Mexico State University. Las Cruces.

Carruthers, Garrey and Clyde Eastman. 1974. An Inventory of Natural, Human, and Social Overhead Capital Resources In North-Central New Mexico. Agricultural Experiment Station Research Report 184. New Mexico State University. Las Cruces.

Carruthers, Garrey and Clyde Eastman. 1971. A Comparative Economic Analysis of North-Central New Mexico. Agricultural Experiment Station Research Report 211. New Mexico State University. Las Cruces.

Carruthers, Garrey; Keith Mitchell; and Thomas O. Williams. 1972. An Interindustry Model of the Economy of North-Central New Mexico. Agricultural Experiment Station. Research Report 237. New Mexico State University. Las Cruces.

Carruthers, Garrey; Kathy Renner; and N. Scott Urquhart. 1973. Expansion of Economic Base Analysis: Labor Availability In North-Central New Mexico for the North-Central New Mexico Economic Development District. Agricultural Experiment Station Research Report 264. New Mexico State University. Las Cruces.

Carruthers, Garrey; Kathy Renner; and N. Scott Urquhart. 1973. A Socio-Economic Analysis of Labor Mobility, North-Central New Mexico. Agricultural Experiment Station Research Report 258. New Mexico State University. Las Cruces.

Clary, Warren P. 1975. Range Management and Its Ecological Basis In the Ponderosa Pine Type of Arizona: The Status of Our Knowledge. Rocky Mountain Forest and Range Experiment Station Research Paper RM-158. U.S. Department of Agriculture - Forest Service. Fort Collins, Colorado.

Clevenger, Thomas S. 1971. Land Resources In the Four Corners Economic Development Region. Agricultural Experiment Station Special Report 4. New Mexico State University. Las Cruces.

Crow, Loren W. 1973. Analysis of Suspended Particulates Collected At Four Corner Stations Surrounding the Four Corners Power Plant. Report to Arizona Public Service Co. LWC No. 126. November.

Dahl, B.E.; R.E. Sosebee; E.B. Fish; J.P. Goen. 1976. Range Plant and Range Ecosystem Studies Applicable to the Rio Puerco Area, New Mexico. A Report by Range Management Personnel at Texas Tech University, under contract to BLM. Albuquerque.

Damback, C.A. 1944. "A Ten Year Ecological Study of Adjoining Grazed and Ungrazed Woodlands In Northeastern Ohio," Ecological Monograph. 14:225-270.

Daubenmire, R.F. 1974. Plants and Environment. 3rd ed. John Wiley & Sons. pp. 86-101.

Daubenmire, R. and Jean B. Daubenmire. 1968. Forest Vegetation of Eastern Washington and Northern Idaho. Washington Agricultural Experiment Station. Technical Bulletin 61. Pullman, Washington.

Davis, C.A. and G.K. Sintz. Nesting of Mourning Doves At Simon Cieneta. Southwestern New Mexico Agricultural Experiment Research Report 265. New Mexico State University. Las Cruces.

Devos, A. and H.S. Mosby. 1969. "Habitat Analysis and Evaluation, Wildlife Management Techniques," The Wildlife Society. Washington.

Dortignac, E.J. 1962. "An 1890 Irrigation Venture In the Rio Puerco," Vol. XIV, No. 3. New Mexico Professional Engineer.

Dortignac, E.J. 1956. Watershed Resources and Problems of the Upper Rio Grande Basin. U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station Paper.

Downing, R.L. 1959. "Significance of Ground Nesting By Mourning Doves," Journal of Wildlife Management. 23(1):117-118.

Drake, Donald; Stanley Randall; and Michael Skinner. 1973. Evaluation of Economic Impacts of Forest Service Programs In Northern New Mexico: Development of Analytical Tools. U.S. Department of Agriculture - Forest Service. Southwest Resource Group. Natural Resource Economics Division. Economic Research Service. Washington, D.C.

Dusek, G.L. 1975. "Range Relations of Mule Deer and Cattle and Prairie Habitat," Journal of Wildlife Management. 39(3):605-616.

Eastman, Clyde. 1972. Assessing Cultural Change In North-Central New Mexico. Agricultural Experiment Station Bulletin 592. New Mexico State University. Las Cruces.

Eastman, Clyde; Garrey Carruthers; and James A. Lieer. 1971. Evaluation of Attitudes Toward Land in North Central New Mexico. Agricultural Experiment Station Bulletin 577. New Mexico State University. Las Cruces.

Easton, Gary W. 1970. Outdoor Recreation; A Comprehensive Plan for New Mexico. State of New Mexico, Chief Planner. Santa Fe.

Einearsen, A. S. 1948. The Pronghorn and Its Management. The Stockpile Co., Harrisburg.

Endangered Species Act. 1973. Public Law 93-205, 93rd Congress, S.1982. Federal Register, February 10, 1976.

English, Burton C. and James R. Gray. 1976. Socio-Economic Impacts of Proposed Action and Alternatives in the Rio Puerco Allotment. Inventory Statement for Environmental Impact Report, Vols. I and II. Agricultural Experiment Station. New Mexico State University. Las Cruces.

Ffolliott, Peter F. and David R. Patton. 1975. "Production-Rating Functions for Abert's Squirrels in Southwestern Ponderosa Pine," Bulletin 3:44, The Wildlife Society.

Findley, James S.; Arthur H. Harris; Don E. Wilson; and Clyde Jones. 1975. Mammals of New Mexico. University of New Mexico Press. Albuquerque.

Froehlich, J. S.; B. S. Kues; S. G. Lucas; and R. K. Olmo. 1975. Paleontological Resource Assessment of 500,000 Acres in Rio Puerco Grazing Environment Impact Study Area. An unpublished report by the University of New Mexico under contract to BLM. Albuquerque.

Gates, Gerald. 1975. State of New Mexico Department of Game and Fish. Personal communication.

Gjersing, F. M. 1971. A Study of Water Fowl Production on Two Rest Rotation Grazing Units in North-Central Montana. M. A. Thesis. Montana State University. Boseman.

Goode, Rudyard B. and Harold W. Cosley. 1964. The Outlook for Expanding New Mexico's Forest Industries. Bureau of Business and Economic Research, Report 13. University of New Mexico. Albuquerque.

Gray, James R. 1974. Economic Benefits from Small Livestock Ranches in North-Central New Mexico. Agricultural Experiment Station Research Report 280. New Mexico State University. Las Cruces.

Gray, James R. 1963. Marketing Practices of Woodland Owners In New Mexico. Agricultural Experiment Station, Bulletin 473. New Mexico State Universtiy. Las Cruces.

Gray, James R. 1970. Production Practices, Costs, and Returns of Cattle Ranches In the Mountains and Plateau Area of Northwestern New Mexico. Agricultural Experiment Station, Research Report 1974. New Mexico State University. Las Cruces.

Gray, James R. 1974. Survey of Commercial Operations for the Northwest Mountain Plateau Area. New Mexico State University. Las Cruces.

Gray, James R. and Burton C. English. 1976. National Forest Benefits Accruing to Rural Residents of North-Central New Mexico. Agricultural Experiment Station, New Mexico State University with U. S. Department of Agriculture - Forest Service, Rocky Mountain Forest and Range Experiment Station. Las Cruces.

Gray, James R. and Burton C. English. 1976. Socio-Economic Impacts of Proposed Action and Alternatives In the Rio Puerco Allotment. Agricultural Experiment Station Project Number SP 4111-162. March. New Mexico State University. Las Cruces.

Gray, James R. and Burton C. English. 1975. Survey for Rio Puerco Study. New Mexico State University. Las Cruces.

Gray, James R.; George D. Fisk; and Marie Matthews. 1974. "Environmental Costs of Recreation In the Sandia Mountains," New Mexico Business, Vol. 27. October. Bureau of Business and Economic Research. University of New Mexico. Albuquerque.

Hansen, R. M. and L. D. Reid. 1975. "Diet Overlap of Deer, Elk, and Cattle in Southern Colorado," Journal of Range Management. 28(1):43-47.

Harris, V.S. 1974. Economic Development Profile. (Draft). Middle Rio Grande Council of Governments.

Hickey, Wayne C. Jr. 1966. A Discussion of Grazing Management Systems and Some Pertinent Literature. U.S. Department of Agriculture. Denver.

Hormay, August L. 1970. Principles of Rest-Rotation Grazing and Multiple Use Land Management. U.S. Department of the Interior - Bureau of Land Management and U.S. Department of Agriculture - Forest Service.

Howard, Volney W. Jr.; Charles T. Engelking; E. Dwain Glidwell; and John E. Wood. 1973. Factors Restricting Pronghorn Increase On the Jornada Experimental Range. New Mexico State University. Las Cruces.

Hubbard, John P. 1972, 1973, 1974, and 1975. New Mexico Ornithological Society Field Notes, Vols. XI; XII; XIII; and IX (XIV), No. 1. Cedar Crest, New Mexico.

Huey, William S. 1967. "Migratory Game Birds," New Mexico Wildlife Management. State of New Mexico Department of Game and Fish. Santa Fe. pp. 153-164.

Huff, F.A. and S.A. Changnon, Jr. 1972. "Climatological Assessment of Urban Effects On Precipitation At St. Louis," Journal of Applied Meteorology, Vol. 2, No. 5. August. pp. 823-842.

Irwin-Williams, Cynthia. 1973. The Oshara Tradition. Eastern New Mexico University Contributors In Anthropology. Vol. 5, No. 1. Portales.

Ives, Berry and Clyde Eastman. 1975. Impact of Mining Development on an Isolated Rural Community - The Case of Cuba, New Mexico. Agricultural Experiment Station, Research Report 301. New Mexico State University. Las Cruces.

Johansen, Sigurd. 1973. The People of New Mexico. Agricultural Experiment Station, Bulletin 606. New Mexico State University. Las Cruces.

Judge, James W. 1973. Paleo Indian Occupation of Central Rio Grande Valley. University of New Mexico Press. Albuquerque.

Julander, Odell. 1953. "Deer and Livestock Competition In Utah," Western Association, State Game and Fish Commission, 32nd Annual Conference Proceedings. pp. 79-85.

Karr, James R. 1968. "Habitat and Avian Adversity On Strip-Mined Land In East Central Illinois," Condor. 70:348-357.

Karr, James R. and Roland R. Roth. 1971. "Vegetation Structure and Avian Diversity In Several New World Areas," American Naturalist. 105:423-435.

Keur, Dorothy L. 1941. Big Bead Mesa, Memoirs of the Society for American Archeology, No. I. Menasha, Wisconsin.

Keyes, Conrad G., Jr. 1976. Airflow and Air Quality, Rio Puerco Grazing Area; Existing Climatic Conditions, Rio Puerco Grazing Area; and Water Quality Literature Search, Rio Puerco Grazing Area. Final Report, BLM Contract No. YA-512-CT6-73. Southwest Research and Development Company. Las Cruces.

Kricher, John C. 1973. "Summer Bird Species Diversity in Relation to Secession in the New Jersey Piedmont," American Piedmont Naturalist. 89:121-137.

Lansford, Robert R.; Earl F. Sorenson; Bobby J. Creel; and William W. Wile. 1975. Irrigated Cropland Acreage and Sources of Water Used for Irrigation in New Mexico by County. November. Agricultural Experiment Station. New Mexico State University. Las Cruces.

Lavigne, R. J.; R. Kumar; J. Leetham; and V. Keith. 1972. "Population Densities and Biomass of Above Ground Arthropods under Various Grazing and Environmental Stress Treatments on the Pawnee Site," 1971. U. S. International Biome Program Grassland Biome Technical Report 204.

Lee, Levon, and Duncan MacDonald. 1967. "Turkey," New Mexico Wildlife Management. State of New Mexico Department of Game and Fish. Santa Fe.

Leopold, Aldo. 1933. Game Management. Charles Scribner's Sons, New York.

Levi, Herbert W. and Lorna R. Levi. 1968. Spiders and Their Kin. Western Publishing Company. New York.

Lewis, J. K. 1971. "The Grassland Biome: A Snythesis of Structure and Function," 1970, Range Science. Dept. of Science Serial No. 10. Fort Collins.

Ligon, J. Stokley. 1946. History and Management of Merriam's Wild Turkey. University of New Mexico Press, Albuquerque.

Ligon, J. Stokley. 1961. New Mexico Birds and Where to Find Them. University of New Mexico Press. Albuquerque.

Lowry, W. P. 1967. Weather and Life: An Introduction to Biometeorology. Academic, New York.

Margalef, R. 1963. "On Certain Unifying Principles in Ecology," American Naturalist. 97:357-374.

Margalef, R. 1968. Perspectives in Ecological Theory. University of Chicago Press. Chicago.

Martin, S. Clark. Ecology and Management of Southwestern Semi-Desert Grass-Shrub Ranges: The Status of Our Knowledge. Rocky Mountain Forest and Range Experiment Station Research Paper RM-156. U. S. Department of Agriculture - Forest Service. Fort Collins.

Martin, W. C.; M. Barr; E. Kelly; T. Manthey; J. Van Lok; and W. Wagner. 1975. Survey of the Rio Puerco Planning Unit for Threatened and Endangered Plant Species. Unpublished Report. BLM, Albuquerque.

McArthur, J. Wayne; Darwin B. Nielson; and Jay C. Anderson. 1973. Range Improvements on the Rangelands of the Four Corners Economic Development Region. Agricultural Experiment Station, Special Report 23. New Mexico State University. Las Cruces.

McKean, W. T. and R. W. Bartmann. 1972. "Deer-Livestock Relations On a Pinyon-Juniper Range in Northwestern Colorado," Colorado Division of Wildlife, Final Report: Project W-101-R.

McNitt, Frank. 1972. Navajo Wars, Military Campaigns: Slave Raids and Reprisals. University of New Mexico. Albuquerque.

Morris, M. G. 1967. "Responses of Some Phytophagous Insects to Cessation of Grazing," Journal of Applied Ecology. 4:459-474.

Nerney, N. J. 1958. "Grasshopper Infestations in Relation to Range Conditions," Journal of Range Management. 11:247.

New Mexico State University - Agricultural Experiment Station with U. S. Department of Agriculture - Forest Service. Rocky Mountain Forest and Range Experiment Station. 1975. Socio-Economic Impact on Rural Communities of Developing New Mexico's Coal Resources. New Mexico State University. Las Cruces.

New Mexico State University. 1976. Vegetation and Grazing Influences on San Luis Watersheds (Gary B. Donart); and Review of Grazing Studies in the Western United States (Rex D. Pieper). BLM Contract Report No. YA-512-CT6-36. Las Cruces.

Norris, J. J. 1950. Effects of Rodents, Rabbits and Cattle on Two Vegetation Types in Semi-Desert Range Land. New Mexico State Agricultural Experiment Station. Las Cruces.

Odum, E. 1971. Fundamentals of Ecology. Third Edition. W. B. Saunders Co. Philadelphia.

Odum, Eugene P. 1969. "The Strategy of Ecosystem Development," Science. 164:262-270.

Owens, R. A., and M. T. Myers. 1973. "Effects of Agriculture Upon Populations of Native Passerine Birds of an Alberta Fescue Grassland," Canadian Journal of Zoology. 51:697-713.

Pepper, J. H. 1955. "The Ecological Approach to Management of Insect Populations," Journal of Economic Entomology. 48:451-456.

Peterson, Roger Tory. 1961. A Field Guide to Western Birds. Houghton Mifflin Co. Boston.

Phillips, P. 1936. "The Distribution of Rodents in Overgrazed and Normal Grasslands of Central Oklahoma," Ecology. 17(4):673-679.

Pike, Ralph. 1969. Storm Data, Hail, Thunderstorms. U. S. Weather Bureau. Albuquerque.

Quast, J. 1954. "Rodent Habitat Preference on Foothill Pastures in California," Journal of Mammalogy. 35(4):515-521.

Randall, Alan and Joe Denbre. 1972. Inventory of Water Diversions and Rate Structures for Cities, Towns, and Villages in New Mexico. Agricultural Experiment Station, Research Report 241. New Mexico State University. Las Cruces.

Raught, Dick. 1976. Northwest Area Game Manager, State of New Mexico Department of Game and Fish. Personal communication.

Reardon, Patrick O. and Leo B. Merrill. 1976. "Vegetative Response Under Grazing Management Systems in the Edwards Plateau of Texas," Journal of Range Management. 29:195-198.

Reardon, P. O.; C. L. Leinweber; and L. B. Merrill. 1974. "Response of Sideoats Grama to Animal Saliva and Thiamine," Journal of Range Management. 27(5):400-401.

Recher, Harry F. 1969. "Bird Species Diversity and Habitat Diversity in Australia and North America," American Naturalist. 103:75-80.

Reeve, Frank D. 1960. "Navajo-Spanish Diplomacy, 1770-1790," The New Mexico Historical Review, Vol. XXXV, No. 3 Albuquerque.

Reeve, Frank D. 1959. "The Navajo-Spanish Peace: 1720s-1770s," The New Mexico Historical Review. Vol. XXXIV, No. 1. Albuquerque.

Reeve, Frank D. 1957. Seventeenth Century Navajo-Spanish Relations," The New Mexico Historical Review, Vol. XXXII, No. 1. Albuquerque.

Reeve, Frank D. 1958. "Navajo-Spanish Wars 1680-1720," The New Mexico Historical Review. Vol. XXXIII, No. 1. Albuquerque.

Reiland, L., and G. Haynes. 1963. Flow Characteristics of New Mexico Streams. New Mexico State Engineer's Office, Santa Fe.

Rittenhouse, Jack D. 1965. Cabezon, New Mexico. Stage Coach Press. Santa Fe.

Robbins, Chandler S. 1966. Birds of North America. Western Publishing Co. Racine, Wisconsin.

Ross, Herbert H. 1965. A Textbook of Entomology. John Wiley & Sons. New York.

San Luis Watershed Study. 1971, 1972. USDA, USFS. Rocky Mountain Forest and Range Experiment Station. Published and unpublished reports. Albuquerque District Office.

Schmidt-Nielsen, K. 1959. "Salt Glands," Scientific American. 200(1):109-116.

Schorger, A. W. 1966. The Wild Turkey: Its History and Domestication. University of Oklahoma Press. Norman, Oklahoma.

Schwartz, C.C. and J.G. Nagy. 1976. "Pronghorn Diets Relative to Forage Availability in Northeastern Colorado," Journal of Wildlife Management. 40(3):469-487.

Scott, Virgil E. and Erwin L. Boeker. 1973. "Seasonal Food Habits of Merriam's Turkeys on Fort Apache Indian Reservation," Wild Turkey Management. University of Missouri Press. Columbia.

Seibert, Donald J.; Robert J. Oakleaf; J. Michael Laughlin; and Jerry L. Page. 1976. Nesting Ecology of Golden Eagles in Elko County, Nevada. BLM Technical Note.

Siemers, C. T. 1975. "Upper Jurassic and Upper Cretaceous Stratigraphy and Sedimentology - Eastern San Juan Basin, New Mexico," Field Trips to Central New Mexico. American Association of Petroleum Geologists. Albuquerque.

Smith, C.C. 1940. "The Effect of Overgrazing and Erosion upon Biota of the Mixed Grass-Prairie of Oklahoma," Ecology. 21:318-397.

Smith, Dixie R. 1975. Proceedings of the Symposium on Management of Forest and Range Habitat on Non-Game Birds. USDA, USFS. General Tech Report WO-1.

State of New Mexico. Department of Agriculture. 1975. New Mexico Agricultural Statistics, 1974.

State of New Mexico. Department of Development. Economic Development Division. 1975. Community Profile - Bernalillo 1974-1975. Santa Fe.

State of New Mexico. Department of Education. New Mexico School District Profile. Santa Fe.

State of New Mexico. Department of Finance and Administration. Local Government Division. 1974. Fifteenth Annual Report. Santa Fe.

State of New Mexico. Department of Finance and Administration. Public School Finance Division. 1974. Statistics. Santa Fe.

State of New Mexico. Department of Game and Fish. 1974. Annual Report, Fiscal Year 1973, Vol. 68. Santa Fe.

State of New Mexico. Department of Health and Social Services. 1972. New Mexico State Plan for Hospitals and Health Care Facilities, Survey, Construction and Modernization. Santa Fe.

State of New Mexico. Environmental Improvement Agency. 1976. Air Quality Standards.

State of New Mexico. Highway Department. Planning and Programming Division. 1974. Road and Street Mileage in New Mexico. Santa Fe.

State of New Mexico. Inspector of Mines. 1974. Sixty-first Annual Report. Albuquerque.

State of New Mexico. Interstate Stream Commission and New Mexico State Engineer's Office. 1974. County Profile, Sandoval County, New Mexico. Santa Fe.

State of New Mexico. State Engineer. 1966. Rules and Regulations for Groundwater In New Mexico.

State of New Mexico. 1976. "The New Mexico State Comprehensive Outdoor Recreation Plan," State Planning Office. Santa Fe.

State of New Mexico. Water Quality Control Commission. 1973. New Mexico Water Quality Control Standards.

State of New Mexico. Water Quality Control Commission. 1975. Water Quality In New Mexico.

Stebbins, Robert. 1966. A Field Guide To Western Reptiles and Amphibians. Houghton Mifflin Co. Boston.

Stewart, Robert H. 1967. "Mule Deer," New Mexico Wildlife Management. New Mexico State Department of Game and Fish. Santa Fe.

Stoddart, L.A. and A.D. Smith. 1943, 1955. Range Management, Second Edition. McGraw-Hill Book Co. New York.

Sundstrom, Charles; William G. Hepworth, and Kenneth L. Diem. 1973. Abundance, Distribution and Food Habits of the Pronghorn. Wyoming Game and Fish Commission. Cheyenne.

Swank, Wendell G. 1965. The Mule Deer In Arizona Chaparral. Arizona Game and Fish Department. Phoenix.

Taber, R.D., and Dasmann, R.F. 1957. "The Dynamics of Three Natural Populations of Deer (Odocoileus hemionus columbianus)," Ecology. 38(2):233-246.

Taylor, Marlowe M. 1960. Rural People and Their Resources, North-Central New Mexico. Agricultural Experiment Station, Bulletin 448. New Mexico State University. Las Cruces.

Technology Application Center. 1976. NASA. Rio Puerco Historical Photo Analysis. The University of New Mexico. Albuquerque.

Technology Application Center. 1976b. NASA. Comparative Phenologies of 15 Shrub and Semi-shrub Species in the Southwest. The University of New Mexico. Albuquerque.

Texas Tech University. 1976. Range Plant and Range Ecosystem Studies Applicable to the Rio Puerco Area, New Mexico. A report by the Range Management Personnel at Texas Tech University, under contract to BLM, Albuquerque.

Thelenus, J.F. and K.E. Hungerford. 1967. "Browse By Cattle and Deer - North Idaho," Journal of Wildlife Management. 31(1):141-145.

Tuan, Yi-Fu; C.E. Everard; J.G. Widdison; and I. Bennet. 1973. The Climate of New Mexico. New Mexico State Planning Office.

Twitchell, R.E. 1914. Spanish Archives of New Mexico, Vol. 1.

U.S. Department of Agriculture. Agricultural Statistics. 1975. Government Printing Office. Washington.

U.S. Department of Agriculture - Forest Service. 1974. A Report On the Upper Rio Grande Basin - Water and Related Land Resources. New Mexico.

U.S. Department of Agriculture - Forest Service. 1968. Production Capabilities of Some Upper Rio Puerco Soils of New Mexico. Rocky Mountain Forest and Range Experiment Station, Bulletin 108.

U.S. Department of Agriculture - Soil Conservation Service. 1937. A Report On the Cuba Valley, Regional Bulletin 36, Conservation Economics Series No. 9. Albuquerque.

U.S. Department of Agriculture - Soil Conservation Service. 1968, Cabezon Area Soil Survey. Agriculture Experiment Station, Research Report 188.

U.S. Department of Agriculture - Soil Conservation Service. 1971. "Guide for Developing the Soil Loss Tolerance Factor (T) In the Universal Soil Loss Equation," p.4, Guide for Interpreting Engineering Uses of Soils.

U.S. Department of Agriculture - Soil Conservation Service. 1973, 1974. Upper Rio Grande Basin - Water and Related Land Resources, New Mexico. Portland, Oregon.

U.S. Department of Agriculture; U.S. Department of the Interior; and, State of New Mexico Game and Fish. Undated. Big Game Browse Range Analysis Techniques for New Mexico.

U.S. Department of Agriculture; U.S. Department of the Interior; and, State of New Mexico Game and Fish Department. 1967. Sandoval County, New Mexico.

U.S. Department of Commerce - Bureau of Census. 1972. Census of Population, 1970. Government Printing Office. Washington.

U.S. Department of Commerce - Bureau of Census. 1974. Census of Retail Trade, 1972, Area Series, New Mexico, UC-72-A32. Government Printing Office. Washington.

U.S. Department of Commerce - Bureau of Census. 1974. Census of Wholesale Trade, 1972. Area Series, New Mexico, WC-72-A32. Government Printing Office. Washington.

U.S. Department of Commerce - National Oceanic and Atmosphere Administration (NOAA). 1973. Weather Modification Summary Report, Fiscal Year 1972. pp. 104-113.

U.S. Department of Health, Education and Welfare. 1970. Health Resource Statistics. Public Health Service. Maryland.

U.S. Department of the Interior - Bureau of Land Management. 1976. BLM Manual 1601-1608. Albuquerque.

U.S. Department of the Interior - Bureau of Land Management. 1976. BLM Manual 6300, "Visual Resource Management." Albuquerque.

U.S. Department of the Interior - Bureau of Land Management. BLM Manual 7120, "Watershed Management." Albuquerque.

U.S. Department of the Interior - Bureau of Land Management. BLM Manual 7817.1 and 7332.11B8. Albuquerque.

U.S. Department of the Interior - Bureau of Land Management. 1976. "Forest Inventory." Unpublished. Albuquerque District Office.

U.S. Department of the Interior - Bureau of Land Management. 1975. Rio Puerco Planning Unit Resource Inventory. Albuquerque District Office.

U.S. Department of the Interior - Bureau of Land Management. 1975. "Rio Puerco Resource Inventory File." Unpublished. Albuquerque District Office.

U.S. Department of the Interior - Bureau of Land Management. 1975. Rio Puerco Watershed Management Plan. Unpublished Report. Albuquerque District Office.

U.S. Department of the Interior - Bureau of Land Management. 1971 with revisions. "Transportation Plan Diagram." Albuquerque.

U.S. Department of the Interior - Bureau of Reclamation in cooperation with the State of New Mexico. 1976. New Mexico Water Resources Assessment for Planning Purposes (Draft).

U.S. Department of the Interior - Fish and Wildlife Service. 1976. Black-Footed Ferret Investigations - BLM Rio Puerco Impact Statement Area. Unpublished study under contract to BLM.

U. S. Department of the Interior - Fish and Wildlife Service. 1972, 1974. Predator Survey of Western U.S. Division of Wildlife Service. Denver.

U. S. Department of the Interior - Task Force. 1971. Off Road Recreation Vehicles. Study No. 721-1951 6491-3. Washington.

U. S. Department of the Interior. 1972. Water Resources Data for New Mexico: Part 1, Surface Water Records. Washington.

U. S. Weather Bureau. 1939-1975. Climatological Records and Summary. Albuquerque.

University of New Mexico. 1975. Effects of Livestock Grazing on Populations of Non-Game Animal Species of the Rio Puerco Environmental Statement Area. An unpublished report by UNM, under contract to BLM. Albuquerque.

Vickery, P. J. 1972. "Grazing and Net Primary Production of a Temperature Grassland," Journal of Applied Ecology. 9:307-314.

Von Eschen, G. F. 1961. Climatological Summary of Cuba. U.S. Weather Bureau. Albuquerque.

Weaver, H. E. and H. W. Rowland. 1952. "Effects of Excessive Natural Mulch on Development, Yield and Structure of Native Grassland," Botanical Gazette. 114:1-19.

Welty, J. C. 1962. The Life of Birds. W. B. Saunders Co. Philadelphia.

White, Koch, Kelley and McCarthy, Attorneys at Law and the State of New Mexico Planning Office. 1971. Land Title Study. State Planning Office. Santa Fe.

Widdison, Jerald Gwayn. 1958. "Historical Geography of the Middle Rio Puerco Valley, New Mexico," M. A. Thesis University of Colorado.

Wiens, J. A. 1974. "Habitat Heterogeneity and Arian Community Structure in North American Grasslands," Condor. 76:385-400.

Wiens, J. A. 1973a. "Pattern Process in Grassland Bird Communities," Ecological Monograph. 43:237-270.

Wiens, J. A. 1973b. "International Habitat Variation in Grasshopper and Savannah Sparrows." Ecology. 54:877-884.

Wilson, Lanny O. 1973. Birds, Mammals, Reptiles, and Amphibians of New Mexico. Open file report. Bureau of Land Management. Santa Fe.

Yoakum, J. and W.P. Dasmann. 1969. "Habitat Manipulation Practices, Wildlife Management Techniques," The Wildlife Society. Washington.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1978—771—869 ☆

Form 1279–3
(June 1984)

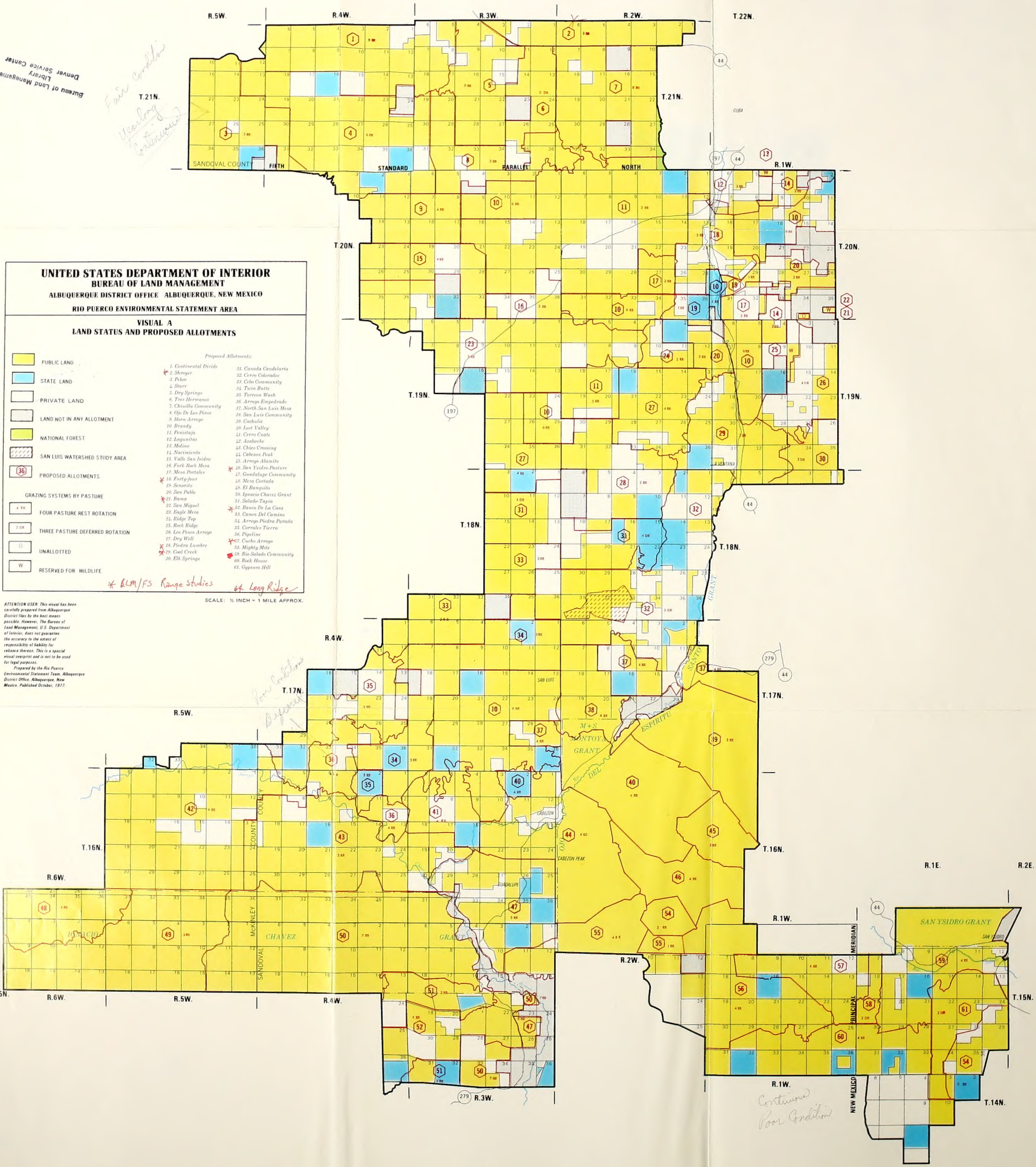
SF 85.35 .M

Final envir
statement

DATE
LOANED

USDI – BLM

Bureau of Land Management
Library
Denver Service Center



Fair Condition

Yearlong Continuous

Poor Condition

Deferred

Continuous Poor Condition

UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE ALBUQUERQUE, NEW MEXICO

RIO PUERCO ENVIRONMENTAL STATEMENT AREA

VISUAL A
LAND STATUS AND PROPOSED ALLOTMENTS

🟨	PUBLIC LAND
🟦	STATE LAND
☐	PRIVATE LAND
▨	LAND NOT IN ANY ALLOTMENT
🟩	NATIONAL FOREST
▨	SAN LUIS WATERSHED STUDY AREA
36	PROPOSED ALLOTMENTS

GRAZING SYSTEMS BY PASTURE

4 RR	FOUR PASTURE REST ROTATION
3 DR	THREE PASTURE DEFERRED ROTATION
O	UNALLOTTED
W	RESERVED FOR WILDLIFE

Proposed Allotments:

1. Continental Divide
*2. Shroyer
3. Pelon
4. Starr
5. Dry Springs
6. Tres Hermanos
7. Chivilla Community
8. Ojo De Los Pinos
9. Horn Arroyo
10. Brandy
11. Penistaja
12. Lagunitas
13. Molino
14. Nacimiento
15. Valle San Isidro
16. Fork Rock Mesa
17. Mesa Portales
*18. Forty-four
19. Senorito
20. San Pablo
*21. Bama
22. San Miguel
23. Eagle Mesa
24. Ridge Top
25. Rock Ridge
26. Los Pinos Arroyo
27. Dry Well
*28. Piedra Lumbre
*29. Coal Creek
30. Elk Springs
31. Canoda Candelaria
32. Cerro Colorados
33. Cebo Community
34. Twin Butte
35. Torreon Wash
36. Arroyo Empedrado
37. North San Luis Mesa
38. San Luis Community
39. Cachulie
40. Lost Valley
41. Cerro Cuate
42. Azaboche
43. Chico Crossing
44. Cabezon Peak
45. Arroyo Alamito
*46. San Ysidro Pasture
47. Guadalupe Community
48. Mesa Cortada
49. El Banquito
50. Ignacio Chavez Grant
51. Salado-Tapia
*52. Banco De La Casa
53. Canon Del Camino
54. Arroyo Piedra Parada
55. Corrales Tierra
56. Pipeline
*57. Cucho Arroyo
58. Mighty Mite
59. Rio Salado Community
60. Rock House
61. Gypsum Hill
64. Long Ridge

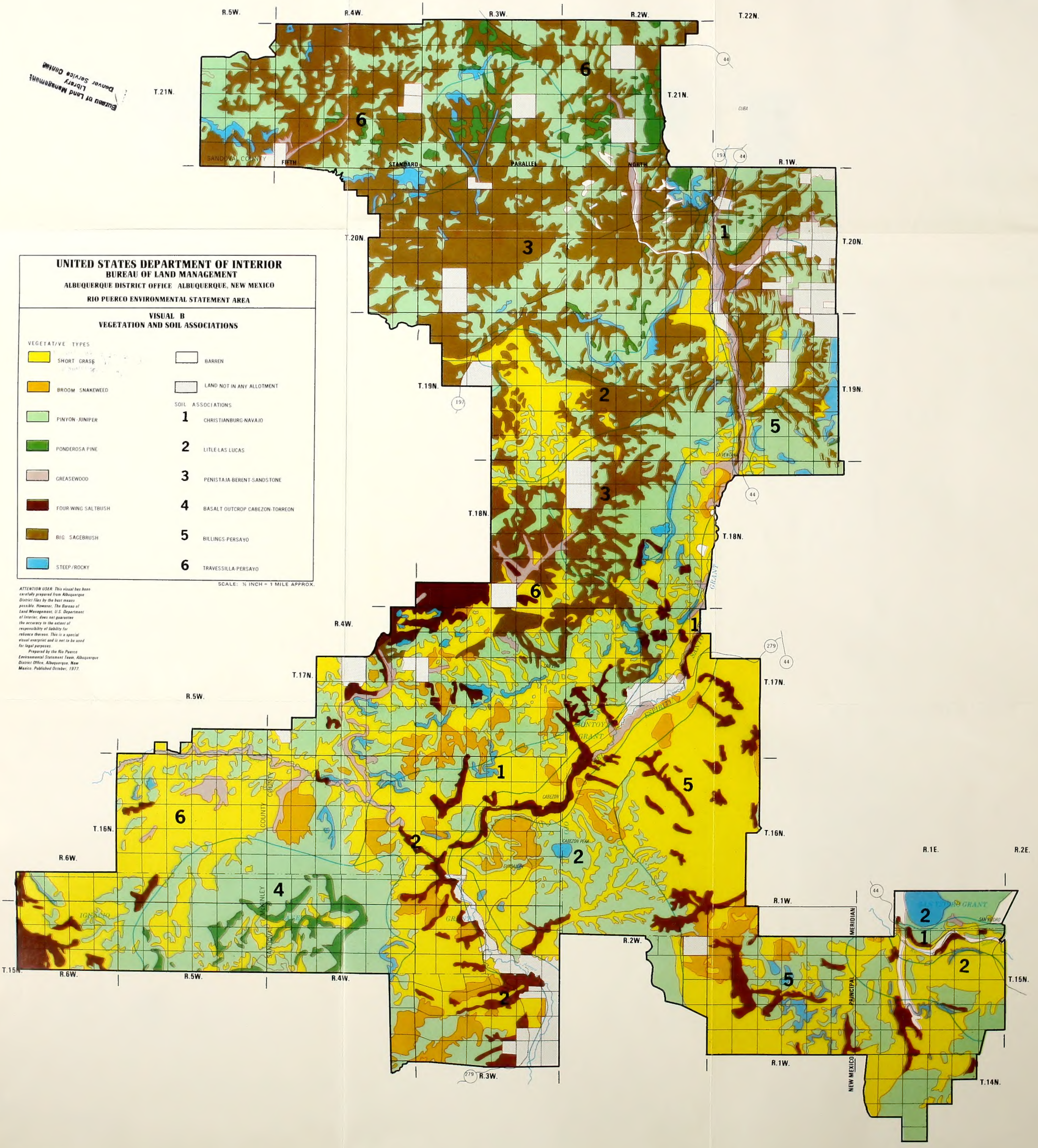
* BLM/FS Range Studies

SCALE: ½ INCH = 1 MILE APPROX.

ATTENTION USER: This visual has been carefully prepared from Albuquerque District files by the best means possible. However, The Bureau of Land Management, U.S. Department of Interior, does not guarantee the accuracy to the extent of responsibility of liability for reliance thereon. This is a special visual overprint and is not to be used for legal purposes.

Prepared by the Rio Puerco Environmental Statement Team, Albuquerque District Office, Albuquerque, New Mexico. Published October, 1977.

Bureau of Land Management
Library
Denver Service Center



UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE ALBUQUERQUE, NEW MEXICO

RIO PUERCO ENVIRONMENTAL STATEMENT AREA

VISUAL B
VEGETATION AND SOIL ASSOCIATIONS

VEGETATIVE TYPES			
🟨	SHORT GRASS	☐	BARREN
🟧	BROOM SNAKEWEED	▨	LAND NOT IN ANY ALLOTMENT
		SOIL ASSOCIATIONS	
🟩	PINYON-JUNIPER	1	CHRISTIANBURG-NAVAJO
🟩	PONDEROSA PINE	2	LITLE-LAS LUCAS
▨	GREASEWOOD	3	PENISTAJA-BERENT-SANDSTONE
🟥	FOUR-WING SALTBUSH	4	BASALT OUTCROP CABEZON-TORREON
🟫	BIG SAGEBRUSH	5	BILLINGS-PERSAYO
🟦	STEEP/ROCKY	6	TRAVESSILLA-PERSAYO

SCALE: ½ INCH = 1 MILE APPROX.

ATTENTION USER: This visual has been carefully prepared from Albuquerque District files by the best means possible. However, The Bureau of Land Management, U.S. Department of Interior, does not guarantee the accuracy to the extent of responsibility of liability for reliance thereon. This is a special visual overprint and is not to be used for legal purposes.

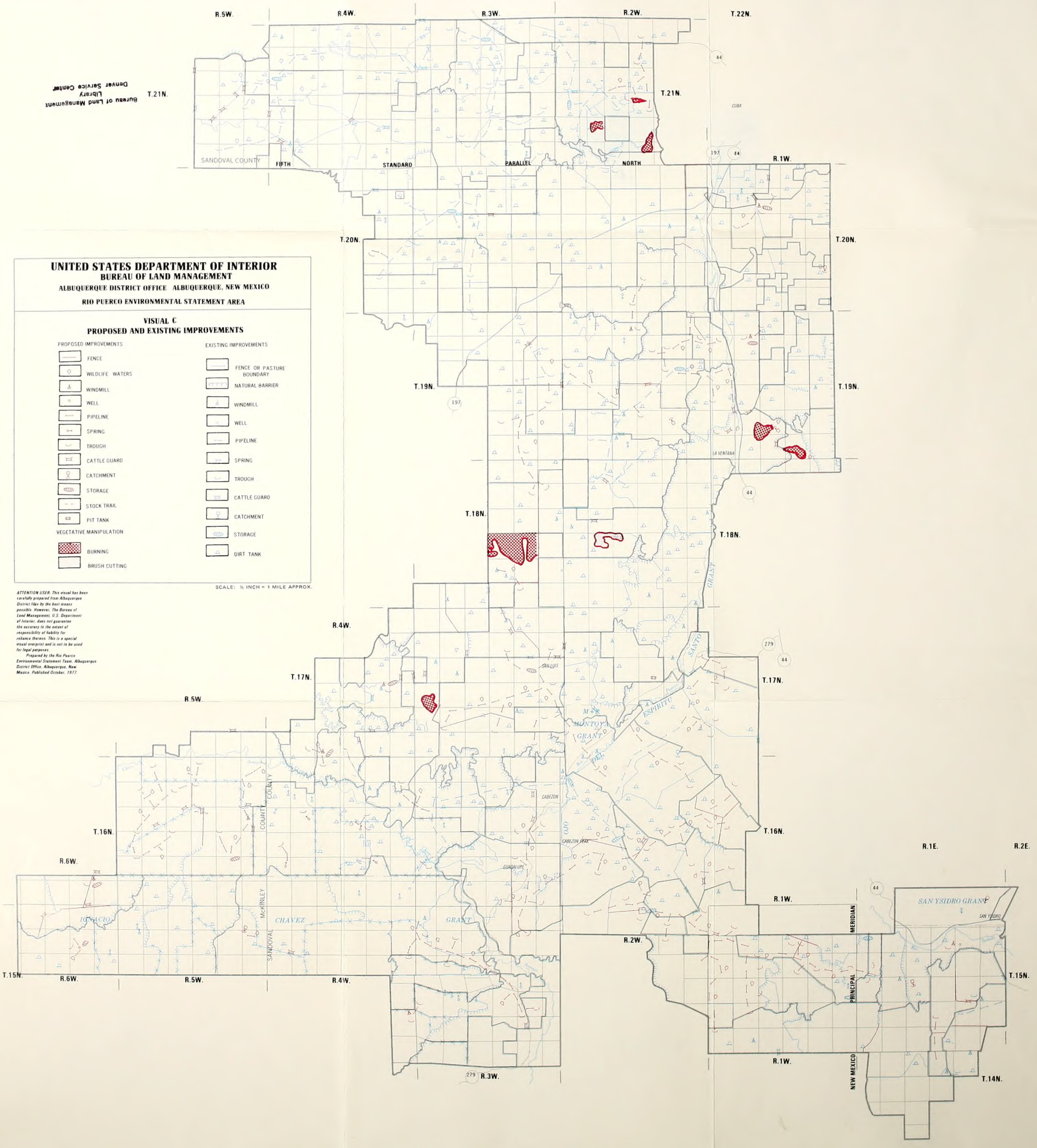
Prepared by the Rio Puerco Environmental Statement Team, Albuquerque District Office, Albuquerque, New Mexico. Published October, 1977.

Bureau of Land Management
Library
Denver Service Center

UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE ALBUQUERQUE, NEW MEXICO

RIO PUERCO ENVIRONMENTAL STATEMENT AREA

VISUAL C
PROPOSED AND EXISTING IMPROVEMENTS



ATTENTION USER: This visual has been carefully prepared from Albuquerque District files by the best means possible. However, The Bureau of Land Management, U.S. Department of Interior, does not guarantee the accuracy to the extent of responsibility of liability for reliance thereon. This is a special visual overprint and is not to be used for legal purposes.

Prepared by the Rio Puerco Environmental Statement Team, Albuquerque District Office, Albuquerque, New Mexico. Published October, 1977.

AMERICAN REVOLUTION
NNIAL 1776-1976

USI
VATE USE.

.S.MAIL